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CHILD MIND

AN INTRODUCTION TO PSYCHOLOGY FOR TEACHERS

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Second Edition (Eighth Impression)

LONDON W. B CLIVE
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1927

"That great doctor, Paracelsus, said, 'My books are my patients.' We must do the same. The book we have to study is not the traditional curriculum, but the pupil we have to train. We must start with him and think out the whole educative process on fresh lines, taking him as our basis. The great thing is not to take our present curriculum for granted. All education is self-expression, but self-expression operates along many different avenues."—J. L. PATON, M.A., High Master, Manchester Grammar School. (Address on "The Problem of the Backward Child" at the L.C.C. Conference of Teachers, 1912.)

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PREFACE.

This book treats in a simpler and more abbreviated form the same matter as that dealt with in the larger work entitled *The Fundamentals of Psychology* It is intended for use by students in training colleges, by candidates preparing for such professional examinations as the Board of Education Teacher's Certificate, and by young teachers generally It is intended to be merely an introduction to the subject of Educational Psychology, and, it is hoped, will serve as an inducement to a further study of the subject

Chapters VIII, IX, and XI of this book have been specially added with a view to covering more completely the Syllabus of the Board of Education for candidates for the Teacher's Certificate

The book should prove specially helpful in training colleges, where the amount of time devoted to Psychology, as well as other considerations, makes the use of a larger and more detailed work impossible

Many minor matters have had to be omitted, and much of what is expounded has had to be treated in popular and summary form But, in spite of its brevity, the book will be found to give a clear account of the nature and development of child mind, so far as it is understood

To each chapter a number of questions have been appended In order to prepare answers to these, the

student will require to read, mark, learn, and inwardly digest the substance of the whole chapter. Without such exercises the reading of a book of this nature is almost valueless. The maxim *After impression, expression* applies as much to the study of psychology by teachers as to the learning of the ordinary school subjects by the pupils.

Any criticisms or suggestions, especially from those who use the book, will be most thankfully received.

BENJAMIN DUMVILLE.

PREFACE TO THE SECOND EDITION.

THE great changes which are taking place in our schools, involving smaller classes and more individual methods, imply corresponding modifications in educational doctrine. It should be clearly understood, however, that these modifications are not subversive of the older theory, but rather supplementary to it. They are none the less important. Experimental psychology on the one hand, and psychoanalysis on the other, have made great advances, enriching and transfiguring the ideational content of the modern educationist to an extent which might almost be characterised as revolutionary.

No teacher can now be considered fully qualified who is totally unfamiliar with these recent developments. It has therefore been thought advisable to take the opportunity provided by the printing of a new edition of this book to add a chapter on the "new" psychology.

It is hoped that this chapter will be found fairly comprehensive, and that it will inspire the young teacher to read and investigate further in the new field

Beyond the correction of a few printer's errors, no changes have been made in the old text With all due respect to the new developments, this remains a satisfactory statement of sound theory—as important as ever

BENJAMIN DUMVILLE

CONTENTS.

CHILD MIND.

CHAPTER I.

THE NEED OF A STUDY OF PSYCHOLOGY.

The teacher undertakes to co-operate in the education of the children committed to his care He co-operates with the parent The latter is expected to feed, clothe, and shelter the child, to look after his health, to see that he acquires a number of good habits, and to send him to school clean and tidy. Arrived in school, the child passes under the control of the teacher, whose chief duty it is to *instruct* him.

Education, then, includes *instruction*; but it embraces much more In its widest sense, it includes all the influences which act upon an individual during his passage from the cradle to the grave. Now *everything* that happens to each of us leaves some trace. But the occurrences of early life produce greater and more lasting effects than those of maturity. As we grow up, we become more or less "set" in the ways of thinking and acting to which we have been accustomed during the preceding years Since the early part of life is so important, mankind almost everywhere takes special pains to influence the young. And usually the word *education* is reserved for these endeavours. Employing the word in this

restricted sense, we may say that all young people receive some education during infancy and early childhood (0 to 6 years), most receive some during childhood proper (6 to 12 years), comparatively few at present obtain any considerable amount throughout adolescence (12 to 21 years).[1]

The object of education is to produce good behaviour, *i.e.* conduct which promotes the welfare of society. "I call therefore," says Milton, "a compleat and generous Education that which fits a man to perform justly, skilfully, and magnanimously all the offices both private and publick of Peace and War."[2]

Now the teacher, with his thoughts bent on *instruction*, is apt to lose sight of the whole of which instruction is only a part. He is liable to mistake the means for the end. He is prone to think that the knowledge and skill which the child acquires under his supervision are things of value in themselves. But they are useful only in so far as they enable the child to act for the welfare of himself and the community. Knowledge is power only in so far as it can be applied. Some boys who take high places at the school examinations are far from being successful in after life.

Another reason why some teachers fail to recognise that good behaviour is the ultimate goal of their endeavours is that the meaning of the term is sometimes wrongly restricted. By "good behaviour" we should mean all that Milton implies in the passage just quoted. It includes the whole conduct of life—not merely punctuality, regularity, obedience, and respect, but what we do in every

[1] The numbers, of course, are only approximate. Much variation occurs, especially with regard to the beginning and duration of adolescence in the two sexes. Thus puberty, which is the beginning of adolescence, usually arrives at about 12 with girls, at about 14 with boys.

[2] Milton's *Tractate on Education*, Browning's edition, p. 8.

situation in which we find ourselves It includes the way in which a man carries on his business, the part he takes in public affairs, the manner in which he spends his leisure, the treatment he extends to his children, his wife, his relatives, his friends.

Now it is obvious that all these things cannot be done well unless the individual in question has acquired considerable knowledge and skill. The instruction, therefore, which the teacher gives is of great importance. It is, nevertheless, only a part of a larger whole—the *education* of the child.

Both parent and teacher would do well to keep this ever in mind. At the outset, we attempted roughly to separate their functions. In practice, however, it is not advisable to attempt any such delimitation The two should *co-operate.* What one does the other should appreciate, and what one fails to do the other should attempt to achieve

The teacher, then, must clearly understand that his instruction is not complete in itself. It should be most intimately connected with the other forms of training which the child undergoes. He cannot, therefore, draw a line round his instruction, and consider his work as ending with that. He must do what he can to further the whole process of education. The formation of good habits, the development of right tastes and inclinations, are even more important than mere knowledge and skill.

It is true that often—

> "Evil is wrought by want of thought
> As well as want of heart."

But "thought" and "heart" are not entirely separable. The right "heart" cannot exist without some considerable amount of thought. An idiot, for instance, however
less, can scarcely be said to have a right "heart."

conversely, without a good "heart," sublime thoughts are to a certain extent impossible of comprehension. True, some scoundrels have been men of learning, men in whom the power of thought has attained an advanced stage. Their knowledge and skill, indeed, have made them all the more potent as agents of evil. But it is doubtful whether such intelligent rogues, in spite of their learning, could ever really and completely think the thoughts of the just, upright, and honest person. There are, at any rate, some men who, on account of the depravity of their hearts, are unable to understand fully the point of view of the virtuous. Socrates of old went so far as to maintain that "virtue *is* knowledge." He held that "those who knew what were just and righteous acts would prefer nothing else, while those who did not know could not do them if they would."[1] The latter part of this statement goes no further than the couplet just quoted. But the former, whatever Socrates may have meant by it, can only be justified by reference to some such fundamental connection between "thought" and "heart" as we have attempted to emphasise.

And even within the field of instruction, it is impossible to fix limits. Both in and out of a school a child learns a great many useful things for which the teacher cannot take credit. And it is the duty of the teacher to find out as far as possible what these things are in each particular case, and to ground his own lessons upon them. For, as we shall see more clearly later, we can only learn new things on the basis of knowledge already existing in our minds.

Enough has now been said to show that no clear de-

[1] Quoted by Sidgwick from Xenophon's *Memorabilia* in *History of Ethics*, pp. 24 5.

markation should be made between the instruction which is given in school and the remainder of education In pursuing his course of instruction the teacher should have ever in view the goal to which everything else is but a means—good behaviour Knowing and doing are not to be artificially separated We shall find indeed that they are most intimately connected, acting and re acting upon each other throughout life

If the teacher is to be highly successful in promoting good behaviour, he must know something of the processes involved It is most dangerous to interfere with the working of natural forces which are not clearly understood It is comparable to the rashness of a man who would undertake to sail a ship across the sea without any knowledge of navigation But whereas in this case the per petrator of errors would be likely to suffer in his own person, the ignorant educator often escapes scot free He wrecks a ship, *but he himself is not in it!*

Some educationists have been so impressed with the errors of the past that they have forbidden all interference with the process of early development. Thus Rousseau declared that nobody should be allowed to teach the child anything before the latter reaches the age of twelve If we followed his advice, we should have to abolish all our elementary schools as at present constituted. But nature, left to itself, does not develop wholly on the lines neces sary for man's welfare Just as a garden when neglected by man soon becomes a wilderness of weeds, so a child left to himself would soon become a brutish creature of no use in any civilised community Such a case did once occur A very young boy was left, by some misadventure, in the woods, where he managed to survive When discovered and captured after many years, he was little more than a wild beast. And although a distinguished Frenchman

attempted to educate him, the results fell far short of those obtained with normal boys. With respect to a great many things, he was already "set," and little improvement could be effected.[1]

Rousseau has, however, in spite of his exaggerated statements, called our attention to the fact that we are dealing with natural forces. And, though we find it necessary to interfere with them, we must remember that they still obey certain laws. Just as in the physical world we interfere with the course of nature in order to produce certain results, so in the world of human nature we attempt to make various changes by educative treatment. But in the latter case, as in the former, we must understand the forces with which we deal. We cannot alter the laws of nature. All we can hope to do is to utilise them in order to produce the results we desire. But if we do not understand them, our efforts are likely to end in disaster.

The teacher, therefore, who desires to produce that kind of behaviour which we call "good" must understand the laws of behaviour in general. In other words, he must study psychology. For "Psychology may be . . . defined as the positive science of the conduct of living creatures."[2] It attempts to describe and explain our behaviour.

But since much of our behaviour is due to certain inner or mental states of knowledge, feeling, and impulse, psychology endeavours to investigate these. Now each of us can experience only his own mental states. In dealing with others, we see only the resulting conduct; the inner states which are often largely responsible for that conduct can never be directly examined by us. We can make

[1] For a full account of this case see *Rapports et Mémoires sur le Sauvage de l'Aveyron*, by M. Itard (Paris: Alcan).

[2] McDougall, *Physiological Psychology*, p. 1.

inferences as to their character only on the basis of our own experience of such inner states Hence the starting point of all psychology is introspection, or looking within This branch of psychology is often referred to as *introspective psychology* Another name is *analytic psychology* It is so called because we endeavour to find the elements of which each whole state of mind is composed

But introspective psychology does not explain all our behaviour And, even if it could it would not also completely explain the behaviour of children For introspective psychology results from the analysis of the mental processes of *adults* Children are not naturally given to introspection [1] And one of the greatest mistakes we could make would be to project our own mental states into them We must not think of children as adults on a small scale Unfortunately memory is not sufficiently reliable, even with the best of us, to enable us to reconstruct the past We do well to study the relics of our childhood, to read any of our early epistles which may have been preserved, to get our parents and other friendly elders to describe our former selves as far as they are able Every teacher who wishes to understand children feels the force of the poet's aspiration—

> 'Backward turn backward, O Time, in your flight,
> Make me a child again just for to-night.'

But, after all has been attempted, we are still far from understanding the mental processes of the child The only way to make further progress is to observe carefully the behaviour of the children around us attempting to explain it in terms of mental processes like our own, but

[1] It should, however, be stated that under experimental conditions where the issue has been simplified, children have shown that they can introspect.

remaining continually on our guard against supposing that the mental processes of the child are *the same* as our own

Our present mental processes are possible only after a long period of development. Those of the child are probably much more simple. They doubtless become more and more complex as the child grows up. The increasing complexity is due partly to a natural process of growth, partly to the kinds of experience through which the child passes. It is this latter factor which teacher and parent can most definitely modify. It is here, then, that education has its chance. And the more we can understand of the process of development, and ascertain what part of it is due to a natural process of growth, what part to the various kinds of experience through which the child passes, the more successful we are likely to be in our education of the child. The examination of the processes of mental development which are possible from infancy to maturity is usually called *genetic psychology*. It is almost unnecessary to add that this branch of psychology, though it must always follow some discipline in introspective psychology (without which it could have no meaning), is by far the most important to the teacher.

The young teacher, however, must not suppose that the study of a text-book on genetic psychology will by itself enable him to understand and successfully deal with all his pupils. In the first place, this science is still in its early stages. We know comparatively little of child nature. In the second place, it must be borne in mind that, in spite of many points of similarity, no two children are exactly alike. In such a book as this, it is possible to deal only with the points of similarity. We shall note many principles which apply to children in general. And a knowledge of these will be of extreme value to the

teacher But no one can be highly successful in dealing with children who does not make a study of each one individually, so that variations of treatment are possible Many teachers indeed, who have never studied psychology as a science are extremely successful because of the keen interest which they display in each of their pupils And if one had to decide between a good knowledge of genetic psychology on the one hand and a lively interest in children as individuals on the other, the latter would probably be the more valuable choice Fortunately, however, the two things are not usually found completely separate One tends to engender the other

Questions on Chapter I.

1 What differing meanings have been given to the word *education*? Which is the most satisfactory from the teacher s point of view?

2 Distinguish between *education* and *instruction* indicating the relations between them

3 How could you prove that children do not think and feel exactly like adults?

4 What grounds can you advance in support of the assertion that children think and feel in a manner similar to your own?

5 Distinguish between *analytic* and *genetic* psychology How far is the latter dependent on the former?

6 How is it that some teachers are successful without a knowledge of scientific psychology?

CHAPTER II.

THE NERVOUS SYSTEM.

All behaviour involves the activity of some of the muscles of the body. Each muscle consists of a mass of fibres which have the power of shortening or contracting, thus producing movements. But the muscular fibres cannot act by themselves. They do so only when they are excited by

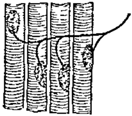

Fig. 1.—Nerve Endings in Muscular Fibres (very highly magnified; diagrammatic).

impulses passing to them through nerve fibres. Each of them receives a fine branch from what is called a *motor nerve*, and this can bring impulses to the muscle in much the same way as a telegraph wire transmits an electric current.

But whence does the motor fibre get its impulse? Each nerve fibre, or *axon* as it is sometimes called, is the prolongation of a *nerve cell*, the two forming a whole which is usually called a *neurone*. The cell body gives off other branches which subdivide and are known as *dendrites*. By

means of these one neurone is more or less closely connected with others. The exact nature of the connections is not known. But it has been observed that in each case the fine branches or *arborisations* from one neurone are in close proximity to those from another. This form of connection is called a *synapse*. (See Fig 3) It is believed that nervous impulses are in some way transmitted from one neurone to another across the synapses

We see, then, how a motor neurone can get an impulse But we have yet to enquire how the other neurone connected with it obtained the excitation The skin of all parts of the body, both external and internal, has embedded in it minute nerve structures which form the endings of what are known as *sensory fibres* These are the axons of cells which together with them constitute *sensory neurones*, and which are connected with other neurones by synapses, through which any excitation affecting them may be transmitted to some of those other neurones.

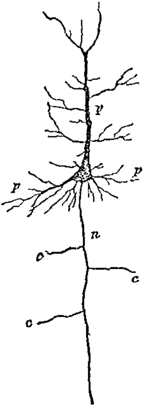

Fig 2 —Pyramidal Cell from the Cerebral Cortex, Stained by the Silver Method. (After Ramon Y. Cajal.)

pp Dendrites, *n*, Nerve Fibre, *cc*, Collateral Branchings of the Nerve Fibre.

Copied from Wundt *Principles of Physiological Psychology* (Sonnenschein.)

The excitation of a sensory neurone arises in the first place through the stimulation of the portion of the skin with

which it is connected by its axon. The word "skin" must be taken in a very comprehensive sense if we wish to include all kinds of stimulus. In the case of the external skin, certain sensory-nerve endings are excited by what we call touch or pressure, others of a different kind

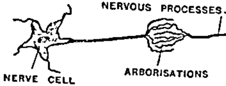

Fig 3.—A Synapse between Neurones (very diagrammatic).

are affected by heat, yet others by cold, and finally others by prickings and various kinds of rough treatment. In the case of the skin of the tongue, all the forms of stimulus already mentioned are possible, but in addition there are other sensory-nerve endings called *taste-buds*, which are stimulated by liquids containing various substances in

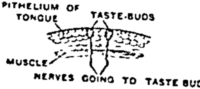

Fig. 4.—Section of small portion of Tongue.

solution. (We cannot taste anything which resists solution.) In the case of the ear, the stimuli consist of vibrations of the air. These set in motion a certain fluid of the inner ear called the *endolymph*, and this affects some tiny hair-cells, which in turn affect the minute

branches of the *auditory nerve* In the case of the eye, the external stimulus is light, and the end organs of the sensory nerve (the *optic nerve* in this case) are spread over the interior of the back half of the eye, forming what is

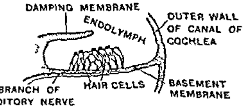

Fig 5 —Section of part of the Inner Ear (highly magnified to show Nerve Ending).

called the *retina*. And so we might proceed. But sufficient examples have been given to show that some form of stimulus from the external world must affect some portion of the "skin" in order to produce an in-going or *afferent* excitation (In contrast to these *afferent* or

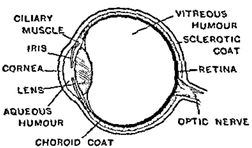

Fig. 6 —Section of the Eye.

sensory excitations, the out going or motor impulses which are conveyed to muscles are often called *efferent* impulses; and the fibres in each case are often designated respectively as *afferent* and *efferent* fibres)

Now the cell-bodies of all neurones are clustered together in what are called *nerve-centres*. Some of these nerve-centres are found scattered about in the body, *e.g.* on the stomach, in the heart, and on both sides of the spine. But these are not the most important from our present point of view. They have to do with stimuli and consequent movements in the interior of the body. The whole system of fibres and nerve-centres which are involved in these matters is called the *sympathetic system*. The nerve-centres which are of most interest for the student of behaviour are those which are found in the brain and spinal cord. These, together with all the connecting fibres within the brain and spinal cord, and all those which constitute nerves both motor and sensory, running to and from all parts of the body, make up what is known as the *central nervous system* or *cerebro-spinal system*.

The details of this system are too complex to admit of examination in this place. The neurones are connected with one another by means of synapses in a great variety of ways. All we can do is to trace some of these connections. The simplest form is that in which a sensory neurone is connected directly with a motor one. Many cases such as this occur in the lower part of the brain and in the spinal cord. If the part of the skin with which the sensory neurone is connected be stimulated, the nervous impulse aroused passes more or less easily[1] through the synapse to the motor neurone, and down the axon of the latter to a muscle fibre. A number of pairs

[1] It is believed "that each synapse presents a certain resistance to the passage of the impulse" (McDougall, *Physiological Psychology*, p. 28). When, therefore, we speak of a strong connection between one neurone and another, we mean that the resistance is very small (either innately or because of previous passages of impulse).

of neurones would usually be affected in this way, and all the fibres of one muscle would be caused to contract, thus giving rise to movement Such a movement is called a *reflex action*. It involves no consciousness, and takes place in a perfectly automatic manner when the proper stimulus is applied. Thus a person in deep sleep can be made to move his leg if the sole of his foot be gently scratched

But the neurones described are connected with many other neurones. For instance, an incoming excitation may be transmitted to many motor neurones, thus causing movement in several muscles. Further, the same neurones are connected with neurones of what are called the *higher centres*. These are in the cortex or rind of the largest and most important part of the brain, which is known as the *cerebrum*. Their cell-bodies give to that part of the cerebrum a greyish appearance, whereas the other parts, which consist almost entirely of connecting fibres, are white. (See Fig 8.) Wherever, indeed, cell-bodies occur, the appearance is greyish But in the spinal cord, the cell-bodies are found in the interior, so that a transverse

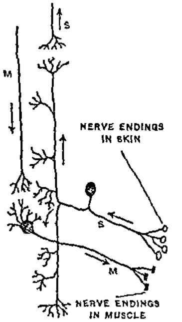

Fig 7 —Diagram showing Arrangement of Neurones in Spinal Centre

S, Sensory Neurone; *S*,, Conduction Path to Higher Centres; *M*, Motor Neurone; *M*,, Conduction Path from Higher Centres. (*S* and *M* would in many cases be very long.) The collateral branchings are connected with other motor neurones (omitted for simplicity).

section of that part of the nervous system appears white on the outside and grey in the centre. (See Fig. 9.)

Since the neurones of the lower centres are connected with those of the higher centres in the brain, nervous

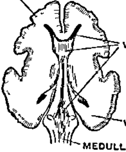

Fig 8.—Section through the Cerebral Hemispheres.

impulses can find their way both upwards to the higher centres and from these downwards to the lower ones. We may say, indeed, that all the sensory and motor neurones of the lower centres have corresponding sensory and motor

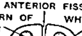

Fig 9 —Transverse Section of the Spinal Cord.

neurones in the cortex of the cerebrum. In some cases the areas occupied by these higher sensory and motor neurones have been definitely mapped out. Figure 10 gives some idea of these results. (The *cerebellum* is part of the lower brain, and the *medulla oblongata* or *bulb* is

another part of the lower brain which, being continued downwards becomes the spinal cord.)

The neurones of the cortex are connected with one another in an immense variety of ways Some of these connections are already formed at birth, others develop as growth proceeds yet others are due to the special kinds of experience through which the individual passes An afferent impulse which travels to the cortex may therefore be transmitted in any of a large number of direc

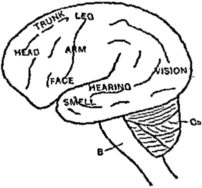

Fig. 10.—Diagram of the Left Hemisphere of the Brain showing Motor and Sensory Centres.

Cb = Cerebellum B = Medulla Oblongata or Bulb.

tions ultimately leading to one or more out of many possible movements The same stimulus therefore, may at different times or in different individuals lead to very different movements Three boys may see a dog In each case the stimulus (light acting upon the retina) is the same But one may run away the second may pick up a stone and throw it at the creature the third may approach and pat the animal

The brain thus controls much of the working of the lower centres ' We may liken the higher levels to the

central office of a telephone system. A message coming in from one house may be directed along each of a large number of wires. So a given stimulus may give rise to an excitation which, if it is deflected to the higher loops, may produce any one of an immense variety of results. It is not, of course, meant that the whole affair is a matter of chance. Strictly speaking, there is no such thing as chance What is meant is that, on account of the large number of connections which exist in the cortex, many tracts may be pursued, though at any given moment the path actually taken is determined by the conditions existing at that moment, so that there would be no chance in the matter at all to one who could know the whole of the conditions."[1]

Consciousness arises only in connection with the excitation of the higher centres. In some cases, the lower centres still work automatically, as in the reflex action already described, but *some* of the higher centres are sufficiently affected to produce consciousness. "In sneezing, for example, we are only too painfully conscious of the irritation of the membrane of the nasal passage and of the violent exertions of the respiratory machinery to effect a cure. Yet we do not will the sneeze; we may rather be said merely to witness and suffer it."[2] Such cases as this are usually called *sensation reflexes*.

In many still more complicated cases, more of the higher centres are involved, and there is more definite consciousness both of the nature of the stimulus and of the resulting action. The whole process, however, though much more complicated than the one just described, is practically automatic. *We cannot help ourselves.* Ex-

[1] Dumville, *The Fundamentals of Psychology*, p. 32.
[2] Welpton, *Physical Education and Hygiene*, p. 121.

which are somewhat imperfect may be strengthened by repetition. In other words, instinctive actions, if persisted in, become habitual. It may be that even the purely instinctive actions are habitual in origin. They seem to be due to habits which have gradually been acquired in the history of the race, and which have become hereditary.[1]

There is, lastly, a still more advanced type of action. For much of our behaviour we feel that *we ourselves* are responsible. We are accustomed to say that we *can* help it. We have a full consciousness of the whole situation which stimulates us to action, there is often lengthy deliberation with respect to the action to be performed, and we finally make up our minds definitely to do a certain thing, often long before the thing has to be done. We feel, then, that what takes place in consciousness is the supreme factor in determining the resulting behaviour. This kind of action is often called *voluntary action*, to distinguish it from all the kinds already described, the latter being often termed *involuntary*.

Now, accompanying all the conscious processes which occur in voluntary action, we must suppose an equally complex series of nervous excitations in the cells of the cortex. As far as we know, no consciousness can occur without the activity of nerve cells in certain parts of the brain. Some psychologists, therefore, have maintained

[1] "Unfortunately the evidence that a change wrought in one individual is transmitted to his offspring is not accepted by the great majority of biologists. Weissmann has demonstrated to the satisfaction of many of his colleagues that the structures of the body are set off from the tissues that are to continue the race so completely that the changes in the body have no influence upon the inheritance of the offspring" (Pillsbury, *Essentials of Psychology*, p. 241). It is impossible, therefore, in the present state of biological theory, to press the suggestion made above.

Many thinkers, however, do not feel justified in stating that any interference can occur in the physical realm which is not due to physical causes. They do not, therefore, venture to affirm the hypothesis of interaction. But they feel that the conscious events play their part. They consequently affirm that there are two sets of processes going on together (mental and nervous), but they abstain from saying anything about the nature of the connection between them, though they admit that it is an extremely intimate one. When talking of any complex form of behaviour, they permit themselves to refer now to the mental aspect, now to the cortical or cerebral, without thereby implying that they know anything of the nature of the close connection which exists between them. Professor Stout, for instance, takes this course.[1] It is usually referred to as the hypothesis of *psycho-physical parallelism*.

Reverting to the hypothesis of the "mechanical" school represented by such men as Huxley, we may note that these thinkers believe all behaviour to be ultimately explainable in terms of neural process. According to them, we must wait for further progress in physiology, especially in the physiology of the brain, before we can make further progress in understanding the mechanism of conduct. Up to the present, however, more light has been thrown on the conditions of complex behaviour from a study of the conscious processes accompanying it than from that of the concomitant cerebral events. Although there are objections to the hypothesis of interaction, we seem to be able to explain behaviour most satisfactorily by assuming it. Practically everybody assumes it in everyday life. To take an example, we find ourselves repeating actions which give us pleasure and

[1] See, *e.g.*, his *Groundwork of Psychology*, pp. 20-8.

inhibiting or stopping actions which are accompanied by pain Pleasure and pain seem thus to be elements of consciousness which have a large share in conditioning our behaviour But we have no knowledge of the kinds of nervous process which accompany pleasure and pain respectively We are quite convinced of certain deter mining factors on the *mental* side, though we have not the slightest notion of what their *nervous* concomitants may be In our endeavours therefore to explain behaviour we find that our best course is to make a careful examina tion of consciousness, based on introspection but helped out by reference to nervous processes wherever possible and to deal with the development of conduct in children in the light of the knowledge thus acquired This accord ingly, we shall proceed to do in the following chapters

QUESTIONS ON CHAPTER II

1 What is *reflex action*? Give examples How is it that a man in a fit, though quite unconscious, may go on breathing regularly?

2 Explain what is meant by the term *sensation-reflex* giving examples

3 Indicate clearly the nature of *instinctive* and *habitual* actions, distinguishing between the two varieties Is there any connection between habit and instinct?

4 What do you understand by the term *voluntary action*?

5 Man is capable of an immensely greater number of responses to his environment than any lower animals Indicate briefly the differences in the structure of his nervous system which render this superiority possible

6 Sketch briefly the theories whi[illegible] respect [illegible] the connection between consciousness and behaviour.

CHAPTER III.

SENSATION, ASSOCIATION AND PERCEPTION.

The most important forms of behaviour are those which rise above the purely reflex level, being accompanied and apparently guided by some degree of consciousness. The baby who turns aside in his toddling to avoid the leg of the table has a far more simple state of consciousness than the student who is writing an answer to a difficult question in psychology. Yet both are alike in certain respects: both are making movements which are guided by cerebral processes involving consciousness.

The child's movements in the case cited are guided merely by his awareness of the physical object before him—the leg of the table: in psychological language, we may say that his activity is practically confined to the realm of *perception*. The student's activity is also to some extent guided by perception. He grasps his pen with his fingers, writes along a given line, and, when he gets to the end of that line, he passes to the next. But above and beyond his mere perception of the physical objects with which he is dealing, he has, let us hope, some *ideas*, and it is these which determine what words and sentences he writes: the chief part of his activity is in the realm of *ideation*.

Now this broad distinction is a general one between the activities of children and those of adults. To take

another example, a little child, present at a fire, laughed with glee at the sight of the flames, but cried with terror on the approach of the strange fire engine The adults around him were terrified by the flames and joyful at the approach of the engine They *perceived* the same things as the child, but they had also *ideas* of their results But although we have here a most important distinction, it is only a rough one On the one hand, even little children soon acquire some ideas, and on the other, adults never leave entirely the world of perception

It is obvious, then that our behaviour is largely determined by our knowledge of the world around us This knowledge begins with mere perception of things But gradually this mere perception becomes enriched We not only *know* things, in the sense that we recognise them are pleased or displeased with them, and avoid or seek them, but we *know about* them, we have ideas of their properties and uses their relations to other things and on account of this higher kind of knowledge our behaviour towards them is very much changed Thus an adult and a baby treat a watch very differently

Our knowledge of the persons and things around us and our behaviour towards them must not be considered as separate It is only by behaving in some way to the objects that we learn more about them *We learn by doing!* This is the cardinal principle of all acquirement of real knowledge

It has been seen that our learning begins in the realm of perception We become aware of the objects around us Now this can only occur on the basis of the *sensations* we receive These are the forms of consciousness which arise when certain sensory neurones in the brain are excited by impulses reaching them from one or more of the sense organs

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But we never get pure sensations. As already noted, these sensory neurones are connected with other neurones in other parts of the brain. More and more connections are made as development proceeds. But it is probable that even in the case of the baby some connections are already formed at birth. The excitation of the sensory neurones in question therefore leads to excitation of other neurones which involve some additional consciousness. Further, some at least of the excitation is usually transmitted through motor neurones to muscles, thus causing movement. This movement gives rise to more sensations, which further complicate the form of consciousness. All this may be summed up by saying that before a pure sensation has time to arise it is overlaid by other mental processes, the whole constituting a *percept*, which is the more or less clear awareness of some external object (a very different thing from mere sensation).

The connections between cortical neurones already formed at birth in the case of the baby are probably very few, and its early percepts are consequently very rudimentary indeed. But in the case of the young of some of the lower animals, many nervous connections are already formed. The young chick perceives *and picks up accurately* the seeds which lie before it on the very first day of its life out of the shell.

Is, then, the young chick more intelligent than the young baby? At birth, it certainly is. But, though it has a large number of connections between cortical neurones already formed, it has a small brain with comparatively few more possibilities of further connections. The child, however, though it has a small number of connections already formed at birth, has a large brain in which on the one hand many new connections develop as life proceeds, and on the other, many more can be formed by reason of

the particular kinds of experience through which the individual passes

It is the business of the educator to see that many of these possible new connections are formed. And he can do his work more efficiently if he understands the way in which they are formed

How, then, do we learn? As already indicated, it is largely a question of forming new connections among neurones. In some cases these connections seem to grow by themselves in the natural course of development. Thus there is no need to worry about teaching a normal infant to walk. During the period between the ages of one and two, the nervous and muscular machinery develops largely by itself. And even if the child is never shown, it will usually start walking of itself.

But a child left to itself does not with the same readiness learn to *talk*. True, children seem to have an innate tendency to utter sounds. And some appear to make words of their own, applying them to definite objects. But this is not at variance with our general statement. We must, in all learning, start from forms of behaviour innately acquired. And the tendency to make and to imitate sounds seems to be one of these. But the understanding and use of language necessitates the forming of connections between the objects perceived and certain sounds perceived and imitated at the same time. Some children may have an unusually strong impulse to the making of a sound of their own composition when they perceive an object. And by repetition they may have stamped in the connection for a time. But in doing this they have learned to name the object in much the same way as we learn the names in common use. Such children have greater initiative than the more ordinary infants, but, once they have produced their new sounds, the learning of them is

Hayward and his doings. He attends keenly to whatever he reads about the cricketer, so that it makes a deep impression on him Once is enough in this case But in the other case, there is less keenness, and many repetitions are necessary to fix the connection between name and number. The more, however, the teacher can evoke the interest of the boy in his history, the deeper will be the impressions made, and the less need will there be for repetition.

The connections we have been describing are usually called *associations*. It remains to point out that *attention must pass* from one thing to another if they are to be associated If I stare at the name *Edward the Elder*, becoming quite familiar with it, so that I can repeat it fluently, and then dismiss it from my mind completely before attending to the date *901*, I shall not associate the two. I must pass from one to the other if I am to associate them so that one will afterwards suggest the other. The neural facts underlying this seem to be (1) that a neurone or system of neurones in a state of excitation tends to attract or drain energy from all other neurones; (2) that any neurone or system of neurones which has just been active, is thus particularly liable to have its excitation drawn from it by the neurone or system of neurones which is just becoming active. Now these conditions always occur when I attend to two things in close connection. For my energy or capacity for attending is limited. I can only attend strongly to one thing at a time Attention to one thing inhibits, at any rate partially, the vividness of the other. And this in physiological terms means the inhibition of excitement in one set of neurones by the rise of excitement in the other. A stream of energy is transmitted through the synapses existing between the two sets, leaving those synapses in a condition of lowered resistance In other words an *association-path* is formed.

Links of this kind are formed between all kinds of things. Mere sounds can be associated together, as in the case of the letters A B C D . . . or the figures 1, 2, 3, 4, . . . heard and repeated by a very little child without any knowledge of their meaning.

Or a sound may be associated with an action, as in the case of the soldier who learns by repetition to drop his hands to his sides and to stand straight upright at the command "Attention!" Or one action with its consequent sensations may be linked with another, as when a person acquires the habit of jerking the superfluous ink off his pen after dipping it in the ink, or as in the learning to play scales on the piano. *Association, then, is the basis of all habit.* And it is well known that unfailing repetition of a given series of acts, or of percepts and acts, or of ideas and acts, is a most important condition in the formation of strong habits.

It is especially important not to have any errors in the early stages of repetition. For this would mean the formation of other connections before the desired connections are firmly established. The spelling of English words, for instance, is largely an affair of habit. We repeat the letters one after another until they become connected. But, if we begin to test the child before he has fixed the connections, he may go wrong, and this error involves the partial formation of another series which is likely to persist. The golden rule in teaching spelling, therefore, is *to avoid mistakes.* We should never test beginners until the desired connections have been tolerably well fixed. The dictation lessons, which occur so frequently, should not be regarded as *tests*, but as *exercises in further fixing* what has already been acquired. The children should not be asked to write words until they can do so. The dictation *exercise*, therefore, should produce few, if

any mistakes throughout the class. It should be regarded as an extension of transcription. In the latter exercise, the boy spells through a word and writes it at once. In dictation, there is an interval between the two processes. The preliminary preparation by looking at and spelling the words should, therefore, be very thorough, so that there are no mistakes in the subsequent writing.

In the formation of some habits, however, we cannot help beginning with some unnecessary links in the chain. In learning to ride a bicycle, for instance, a person begins with all kinds of unnecessary movements in his attempts to maintain equilibrium. The failure of the unnecessary movements and the success of the necessary ones lead to the latter movements receiving more and more attention. They thus become selected from the whole mass of movements and the unsuccessful movements are gradually inhibited. Very soon the series of successful movements becomes fixed and the person is now said to be a skilful rider. Similar processes take place in learning to write, to swim, to row, in fact in the acquirement of all skill.

Associations are also formed between ideas These connections, indeed, seem to have been the first noticed by psychologists. As Locke wrote, "ideas that in themselves are not at all of kin, come to be so united in some men's minds, that it is very hard to separate them; they always keep in company, and the one no sooner at any time comes into the understanding, but its associate appears with it; and if they are more than two, which are thus united, the whole gang, always inseparable, show themselves together."[1]

The same author expresses the wish "that those who have children, or the charge of their education, would

[1] *Essay concerning Human Understanding*, 27th Edition, p. 234.

think it worth their while, diligently to watch, and carefully to prevent, the undue connexion of ideas in the minds of young people."[1] And he gives instances.

"The ideas of goblins and sprights," he says, "have really no more to do with darkness than light; yet let but a foolish maid inculcate these often on the mind of a child, and raise them there together, possibly he shall never be able to separate them again so long as he lives; but darkness shall ever afterwards bring with it those frightful ideas, and they shall be joined, that he can no more bear the one than the other."[2]

"Many children," he adds, "imputing the pain they endured at school to the books they were corrected for, so join those ideas together, that a book becomes their aversion, and they are never reconciled to the study and use of them all their lives after; and thus reading becomes a torment to them, which otherwise possibly they might have made the great pleasure of their lives."[3]

But Locke failed to recognise that practically all our knowledge depends on associations. The child claps his hands at the burning house and cries at the approach of the fire-engine because he fails to understand the meaning of these things. The adult, however, has seen these things before *together with their consequences*, and they now call up with more or less clearness ideas of those consequences. It is this suggestion or revival of traces of past experience which gives meaning to the present events. And the traces of past experience can be revived because that past experience was associated with events like the present ones. The young child merely *perceives* the events, the adult is said to *apperceive* them.

But even perception depends on association, though of

[1] *Op. cit.*, p. 236. [2] *Ibid.* [3] *Op. cit.*, p. 237.

a more intimate kind than that of ideation or apperception It is, indeed, for this reason that we have dealt with association in this chapter As we have already noted, associations can be formed between all kinds of things Thus, as a certain person was at Margate when he heard the result of an important examination, the mention of the town may revive some thought of the examination in his mind But the mention of the town may also lead him to think of the town itself This may involve more or less vague memories of its position, its general appearance, its climate, and so forth. These things are parts or aspects of the town itself They have become associated because they occurred together in his experience of the town They cannot indeed be separated from it, and whenever he thinks of the town, even though he may not go on to single out in thought these various aspects of it, they are more or less implicitly revived in his mind. This closer connection of parts in a whole, such that the parts cannot exist in absolute separation, is called by Professor Stout *complication*

It is this more intimate process of association which enables us to build up our perceptual knowledge of things around us Looking out of the railway train, one says that he sees a tree near the lines All that he really "sees" with his eyes is a sort of picture He has visual sensations only But his perception includes implicitly the assurance that if he were to descend from the train and walk a few yards he would be able to touch the tree, to walk round it, to climb it, and so forth "The sight of a suit of polished armour," says Dr Ward, "instantly reinstates and steadily maintains all that we retain of former sensations of its hardness and smoothness and coldness"[1]

[1] Article "Psychology," *Encyclopaedia Britannica*, 9th edition, part xx., p. 57

As a matter of fact, it is not necessary for us to have had any former sensations of *its* hardness and smoothness and coldness. All that is necessary is that we should have handled many things of a similar nature in the past. In the museums, we frequently read: "Visitors are requested not to touch." Does this limit our powers of perception? Not if we have in the past dealt with many similar things which *may* be touched.

✓ Closely connected with these results of complication is the fact that we have acquired a certain disposition towards the whole thing or series of things presented. When a tune has been played, and one is listening to the last notes, one is not affected merely by these, but one has acquired a certain attitude, probably involving also some emotion. Although even the faintest traces of the early notes seem to have disappeared, there is something left behind. The present notes mean more because of what has gone before. And if, some time later, the tune is commenced again, one recognises it, the general attitude or disposition is revived, even though there is no definite trace of the notes which are to come. The present notes, then, are capable of arousing the whole disposition, even though they may be unable to suggest the actual notes which accompany them. This is called by Professor Stout the *acquirement of meaning*. It is the basis of all our subsequent progress. What exactly are the nervous processes underlying it is difficult to say. Probably there are faint reverberations throughout a number of neurones previously excited more definitely.

We see, then, that the cognitive part of an act of perception has two elements. We experience certain sensations and we think of some object. We may call these two elements the *sensational* and the *ideational*. The ideational element or meaning cannot occur unless the sensations are experienced; it is indeed aroused (on account of associa-

tions previously formed) by those sensations We shall see, however, that when once we have developed this meaning in connection with vivid sensational elements, we can go on to perceive many similar things with the slightest possible core of sensation. And when afterwards we come to call them up in memory, we are able to think of them with very vague traces of the original sensations, and sometimes apparently with none at all

These facts with respect to the nature of perception are of extreme importance to the teacher They indicate that, though we adults take in a great deal by means of sight alone, and with very cursory glances, we can do so only because we have had much previous experience in which we have gained other sensations by handling and actively dealing with things And they should warn us against the erroneous assumption that because *we* "see" so much, children also do To this matter we shall revert in the following chapter

Questions on Chapter III.

1 State clearly what you understand by the term *sensation*.

2. What is meant by *perception*, and what is its relation to *sensation*?

3 We could know nothing if we had never had sensations, yet sensations by themselves give us no knowledge. Explain this apparent paradox.

4 What do you understand by *association*? Show how it works in securing reproduction.

5. Why is it important to avoid mistakes in the early repetitions of something which is being learned? Illustrate by reference (*a*) to the teaching of spelling, and (*b*) to the formation of habits.

6. Why is it necessary for children to handle the things which they deal with?

CHAPTER IV.

PERCEPTION AND OBSERVATION.

The knowledge acquired in perception is obtained in and through movement, and its chief use is to direct, and render more skilful, further movement. We learn by and for doing.

The older psychologists, in their emphasis of the *knowledge* obtained, rather lost sight of the fact that that knowledge was acquired incidentally, as it were, in an active process. They tended to regard perception as a more or less passive process in which we receive sensations which somehow engender percepts. And it has become necessary to emphasise the fact that "perceiving is an *act*, a thing that we *do*, always and everywhere, never a mere passive sensing of a group of passing sensations or impressions. It probably always involves actual innervation of muscles, and indeed co-ordinated and organised, we may say unitized, innervation of muscles. Certainly on the psychic side there is an active and more or less unitized movement of mind, a sense of inner activity."[1] Or, as Dr. Nunn puts it, "the starting-point of the educational process must be the 'sensori-motor reaction.' By this maxim modern pedagogy replaces the maxim—the inspiration of so much of the teaching reform of the last

[1] Huey, *The Psychology and Pedagogy of Reading*, p. 104.

century—that the educational process starts from the child's sensations"[1]

The baby's learning to dodge the table leg is typical of all perceptual progress If we could have a child in possession of all his sense organs, but unable to move, we should find that he would learn little if anything either of himself or of things around him But the normal child is continually moving Nobody can watch a healthy infant without being struck by his tendency to handle look at, roll rattle, bite, and otherwise experiment upon, all objects which come within his reach Now in the movements themselves certain sensations are involved These are usually called *kinæsthetic* or *motor* sensations But other sensations—of sight and of touch—break in upon the kinæsthetic series The kinæsthetic sensations are directly under the child's control He repeats them over and over again But the other sensations are not produced at will They come and go according to the movements made In the early stages some of his movements lead to unpleasant sensations as when he bangs his head against the table Other movements bring pleasant sensations as when he passes his hand over the smooth surface of the table-leg And he gradually learns to make such movements as will avoid unpleasantness and secure the pleasant This process we may call *motor adaptation* to his environment It is only gradually by this motor adaptation that he comes to distinguish things which are not so closely related to him as are his movements In movement, then, he discovers both himself as an active being and external objects as things to which his activities must be adapted Or, as Professor Croom Robertson

[1] T P Nunn on "The General Principles of Handicraft Instruction in *The Journal of Experimental Pedagogy* Nov 1911, p. 113

used to say in his lectures, "the first psychological meaning of object is obstacle."[1]

At the beginning of life, the child's universe, including himself, is probably, as Professor James calls it, "a big, blooming, buzzing confusion," and this is gradually sorted out into its parts through the activities of the child. Or, as Professor Welton puts it, "When we thus study the baby, the mental characteristic which stands out most clearly is that, far from recognising separate sensations and then building them up into more and more complex combinations, his whole consciousness is a vague sentience. In it are at first no distinctions at all, either of things or even of himself from his surroundings. The whole course of life is a progressive analysis of that primary experience. This process goes on throughout by activity."[2] And the first and fundamental stage of this activity is perception.

It would be interesting and profitable to trace a great deal of this progress. But space will not permit. We have already noted how through movement the child comes to distinguish external objects as things independent of himself. It may suffice here to trace one of the stages of that development. The baby plays with his own toes. In doing this he acquires more and more definite percepts, which enable him to distinguish his own body from external objects. But in handling parts of his own body, he not only receives the same kinds of sensations which he would receive were those objects parts of another's body, but he experiences sensations of touch and movement *in connection with the parts handled*. These important additional sensations serve to facilitate the perception of his own body as something quite different from the other objects with which he plays.

[1] Sully, *The Teacher's Handbook of Psychology*, New Edition, p. 163. [2] Welton, *Psychology of Education*, p. 145.

Movement thus gives us ever richer percepts. Every movement that we make, in addition to the sensations to which it gives rise by means of the afferent nerves of the kinæsthetic sense, also changes the other sensations received from the object It gives us new percepts of the same object. Thus when a child moves his hands over an object, he not only gets muscular sensations, but new sensations of contact. As he turns the object about in his hands while looking at it, he gets new views of it. So also when he walks round a large object. When he shakes his rattle, he gets sound sensations as well as the changing visual sensations which he experiences if he happens to be looking at it And it is instructive to note the number of times he will repeat the operation. He seems to be delighted not so much with the noise he produces as with the fact that *he is producing it* The tendency to produce changes in our environment seems to be instinctive. It is sometimes referred to as the love of activity. All forms of play involve it.

Normal individuals, after much experience of the kind described, come at length to perceive many objects by sight alone. But we must not hurry the children on to dependence on one sense. We must remember that *we* are able to gather so much by sight because we have had so much perceptual experience with the other senses We forget that our ability is the result of a long process of development and experience And we are inclined to minimise the importance for the child of touching and handling objects as well as seeing them

Often we are tempted to fall back on words only. We have a perfect right to do this when we are certain that the child has had the experiences which cause those words to have meaning for us. But we must remember that words in themselves are mere sounds. Unless those sounds

have been connected in the past experience of the child with actual handling of the things which *we* mean when we use them, they are of no use. We are thus liable to make the same mistake as the man in the street, who attempts to direct a stranger to a desired destination by talking glibly of many signs and landmarks with which that person is totally unfamiliar.

Now it is obvious that, although all children on their arrival at school have had a large amount of concrete experience which is much the same in every case, there are many things which some have seen and handled and some have not. When, therefore, the teacher uses certain words, some of the children may call up the necessary ideas while others fail to do so. Careful investigation has discovered most alarming differences. Thus the following are a few of the results obtained in a great investigation conducted by Dr. Stanley Hall, a distinguished American psychologist, on "The Contents of Children's Minds on Entering School." [1]

CHILDREN'S IGNORANCE OF COMMON THINGS.

Name of Object.	Percentage of children ignorant of it.		
	In Boston.	In Kansas City.	
		White.	Coloured.
Beehive ...	80·0	59·4	66·0
Crow	77·0	47·3	59·0
Ant	65·5	21·5	19·1
Squirrel ...	63·0	15·0	4·2
Oak	87·0	62·2	58·6
Rainbow ...	65·0	10·3	2·1

[1] *Pedagogical Seminary*, I., pp. 139-173.

In view of such results as these, it is obvious that the process of learning from the concrete is by no means over when children arrive at school. Dr. Hall concludes that "there is next to nothing of pedagogic value which it is safe to assume at the outset of school life. Hence the need of objects and the danger of books and word cram."[1]

Some writers have even advocated the total neglect of reading, writing and arithmetic during the first few years of the primary course, so as to give more time to object lessons and to various manual activities[2] Whether we agree with such extreme views or not, we must admit that there has been a serious lack of real object teaching and real manipulation of objects in the early years of the primary course. The child has been considered too much in the light of a passive recipient of information, not sufficiently in that of an active doer.

Even where handwork has been adopted, it has too often been considered as a training in skill. It *is* that; but it is much more. It involves the great psychological principle of *learning by doing* When a boy is manipulating objects, his attention must necessarily be occupied by them, and usually also by ideas connected with them. Accordingly some form of handwork should be introduced into every subject which is susceptible to such treatment

Let us take as an example a subject which is not often brought into connection with handwork. History, although it involves the imparting of information, can be made to give frequent opportunities for invoking the child's activities to the full. Of course, when the tale is first told by the teacher, the children are largely receptive But every *impression* should be followed by *expression*; without that, the traces of the impression soon fade. "The idea of act-

[1] *Ibid.* [2] *E g.* Hagmann, *Reform in Primary Education.*

ing historical scenes is gaining ground in schools and gives abundant opportunity for the manufacture of all kinds of adjuncts—crowns, sceptres, swords, bows, arrows, targets, etc. Many other objects illustrating history may be made by the scholars. Boats, carts and various implements may be made illustrative of different periods, and dolls dressed in costume to represent a Crusader, a Canterbury Pilgrim, etc. One plan of using handwork in education which we have studied and seen in operation is based entirely on the historical idea. In this scheme the children, from their earliest years, attempt, within their means, to reproduce the early life of mankind. They make their own wigwams, dig out their own canoes, sharpen their stone implements, and weave their own rough cloth and baskets."[1] And in doing these things they come to grasp the reality of the past in a way which would never be possible by oral instruction alone.

Such views of handwork make it essential that it should not be considered as a separate subject, with a special instructor, but as a vivifying influence permeating the whole curriculum, making the children active doers.

Perhaps we adults can best realise the need of *doing* as an essential in *learning* by considering the way in which we ourselves come to understand a new complex. Take as an example a new game of cards. We may have it described to us, we may even watch others playing it; but until we ourselves take a hand in a game, we do not thoroughly understand and appreciate it. As a rule, too, we have no desire to understand it until we arrive at the point of actually taking part in it. And if this is the case with us, how much more is it so with young children! Not nearly enough consideration is given to the question

[1] *Manual Instruction in Public Elementary Schools*, Board of Education, pp. 7, 8.

of ensuring that the children have sufficient motive for their work.

It is found that the children take more pleasure in their school work under these more active conditions And it is coming to be more and more recognised that, in most cases, pleasure is a sign of healthy and profitable activity. Many educationists, indeed, would condemn any system of education under which the children are not thoroughly happy. It is to be noted that the pleasure derived by the children taught according to these modern methods is not merely due to the fact that they are naturally impelled to bodily activity and that indulgence of this tendency is pleasant, but it is also to some extent attributable to the fact that they gain more knowledge of things in this way, and are thus more able to understand the instruction imparted to them When the teacher uses words—and some lessons will always have to be largely oral—these words evoke fuller and richer ideas in the minds of the children because of the more varied experience of the past. Success in understanding is itself pleasurable Few children who are able to follow completely the instruction of the teacher fail to take pleasure in so doing, unless, indeed, the teacher is talking about what they already know very well. It is to be noted, further, that not only do the instinctive tendencies produce pleasure when they are allowed scope for activity, but that the pleasure produced reacts upon the activity, heightening it, and thus rendering it still more effective

In the case of the chick, we saw reason to believe that the perceptual centres were well developed at birth It may very well be that even in the young child, though they are not so fully developed, they are already partially formed, so that the exercise of the arms and hands, in producing kinæsthetic sensations, awakens other [illegible]

perceptual apparatus in the brain. It is likely also that the kinæsthetic areas of the brain are congenitally connected with still higher centres—those of speech and of ideas—and that these higher centres are also aided in their natural development by a large amount of movement. It is found, for instance, that mentally defective children, one of whose prominent characteristics is poverty of speech, are greatly improved with respect to their power over language by a course of educational handwork.

Since perception depends so intimately on movement, it is not surprising that, as the knowledge thereby gained increases, there is a corresponding improvement in skill of movement. As a boy improves by practice in cricket, it is difficult to separate his advance in accuracy of perception from his skill in making the necessary movements. A watchmaker's skill in manipulating the fine mechanism of a watch and his perceptual acquaintance with it develop concurrently. As a boy becomes adept in modelling an object, he gains a more complete knowledge of its form. We find, indeed, that modelling has a good effect on accuracy in drawing.

We have asserted only that *perceptual* knowledge advances concurrently with advance in skill. If we said that *all* knowledge was accompanied by increase in manual dexterity the reader could easily cite contradictory cases. There are, for instance, many acute critics of sports who know a great deal of the game, but who are not very skilful themselves. As a rule they *have* played the game of which they know so much, and have acquired some skill in it. This, indeed, seems to be an essential condition for a sound knowledge of the game. One can only know thoroughly by doing.

To take another example, Ruskin shows in his *Modern Painters*, and in other works, a minute knowledge of the

technique of painting. Yet he was not a highly talented artist. He could and did paint. And without this skill he would never have possessed a foundation for his great knowledge of art. But his skill and perceptual knowledge having developed together up to a certain point, we find his knowledge increasing while his skill lags behind. Our general statement is not thereby invalidated. Skill and knowledge do run parallel *in perception*. But there are further developments of knowledge which go on independently of skill. *Ideas* arise in the course of our developing skill. They begin to arise very early in life, and they enrich, and render more significant, the percepts which we obtain. This play of ideas upon percepts, involving as it does not only a richer significance in the percepts, but additions to, and developments of, the ideas, is known as *observation*.

Now even perception involves some ideas. But they are ideas of a simple type The *acquirement of meaning* to which we referred in the last chapter implies these simple ideas. After some experience with an object, we come to recognise it at a glance And we are also able to recognise some objects as members of classes. Many animals, as well as children, can do this. The dog, for instance, recognises his master. And he is also capable of putting things into classes. He recognises a man, a cat, a bird, another dog The ideas involved in such recognition may be called *particular ideas* when they refer to individuals as such, *generic ideas* when they refer to classes of things. Another name often used for the latter is *recepts* (to distinguish them from a higher type called *concepts*, with which we shall deal later).

These perceptual ideas, although they imply a breaking up of the environment into separate things, do not involve any conscious analysis of those separate things The

various qualities which make up each thing or class of things are fused, as it were, together in the process of perception. This, as we have already seen, is based on *complication*, *i.e.* inseparable association. Thus a very little boy can distinguish a dog, a cat, a horse, quite readily. But if he is asked to *define* each, *i.e.* to state the essential properties which mark off each class from the others, he is at a loss. He has not yet arrived at the point of breaking up the concrete things by thought into their constituent elements, or of definitely noticing the relations existing between one thing and another. Like the animals just mentioned, he takes things *as wholes.* And it is useless to ask him for definitions. He *knows* many things, though he does not *know about* them.

Even we adults remain in this condition with respect to many things. We take them as wholes and deal with them perceptually without ever attempting to analyse them by further thought. Thus many people go up a flight of stairs day by day without ever counting the number. If, by any chance, one stair could be taken away or added, the difference would at once make itself felt. We should find them pawing the air, or stumbling. How many people know *without trying it* which arm goes first into a coat when putting it on? So with the number of buttons on one's waistcoat. Some, of course, especially in such instances as the last, *have* noted these things. And it is instructive to inquire why. Usually it is because they are interested in the matter for some reason. Either they are rather particular about their clothes, or they may have had to buy a set of buttons for the garment in question. We see, then, that observation takes place under normal circumstances when there is some motive or purpose for it. And the teacher should try to make the conditions of his lessons approximate to normal circumstances.

Observation then, involves some analysis of the concrete whole presented in perception Not necessarily an actual analysis of the concrete object,[1] but an analysis *in thought* And each element thus singled out may be called an *abstract idea*

Now if observation is to take place in any given case the observer must already have the abstract ideas Thus a child can observe that a given cat is *black*, with *yellow eyes*, a *long tail*, etc, only if he already has the ideas indicated by the words in question All he does, therefore, is to analyse this particular object into parts with which he is already familiar Most of the fundamental abstract ideas which render observation of this kind possible have already been acquired by the child before he comes to school. What, then, is the use of continuing such observation?

In the first place, it must be borne in mind that the utility of abstract ideas does not reside in the mere fact of possessing them, but in using them to deal with the concrete more satisfactorily Here, as in perception, knowledge is useful only in so far as it helps us in our doing If the child wishes to paint a picture of the cat, he can only do so by noticing the various colours and forms An animal like the dog or horse cannot do this kind of thing He possesses no *abstract* ideas

It is very important to note that observation occurs when we have some motive or purpose which includes manipulation of the concrete The teacher who wishes to induce real observation by the children, not mere slavish following of his directions, would do well therefore to propose something to be done which the children are keen on

[1] When the concrete object itself is analysed or submitted to some change, we call the type of observation *experiment*.

imitates is of great assistance The words do not *give* him the ideas but they help very much in directing his attention thereto There is a close connection in our minds between words and ideas We so constantly use the words and have the corresponding ideas that the association between them becomes extremely strong The one nearly always tends to call up the other The word thus becomes a sort of handle to the idea

This being so we must encourage to our utmost the use of words by the children during their observation Not only does this assure us that the children are using the right ideas but it gives the children greater control over those ideas ' It is hardly possible to over-estimate the extent to which the child s mental growth, due in the first place to his own powers of observation is stimulated by the hearing and use of words [1]

This however does not mean that the teacher is to tell the child what *he* observes To *direct* the child s observa tions is a very different thing from telling him the results of one s own observation In all the object or nature study lessons the teacher should encourage and guide the children by means of questions to look carefully for them selves and say what they see

There are varying degrees in which this can be done The younger children require much more direction and guidance by the teacher The older children have more ideas with which to start, and can be got to carry through observations largely on their own initiative In the nature study lessons of the upper school therefore the teacher has gradually to transform observation from an indis criminate noticing of this and that point to an orderly conning over the visible and inferior creature aided by

[1] Mumford, *The Dawn of Character*, p 31

ideas already possessed, and directed by a purpose connected with those ideas, *i.e.* the desire or curiosity to add to them. Too often the observation lesson deteriorates into a number of vague and random replies by the boys to a number of equally vague and random questions by the teacher. Instead of this, the early part of the lesson should be so arranged that a definite purpose springs up, *is clearly stated*, and works itself out through the succeeding observations. Thus, suppose the lesson is on a fish. The children know that this animal lives in water. The teacher, therefore, can propose that the pupils should note all those properties of the fish which enable it to live in water. The more he can get them really curious to find out these things, the more successful his lesson is likely to be. The purpose must be *theirs*, not merely one in his mind.

Unless a real live purpose is stirred up in their minds, the lesson will tend to be dull and unprofitable. Even if the same observations are attempted as in the case of the lesson with a definite purpose, they will not be undertaken with the same pleasure and profit. But when the children are really in quest of something, these same observations will be suffused with meaning at every stage. Thus the breathing apparatus of the fish will be examined not merely because the teacher requires it to be observed, but because the children want to find out how it enables the fish to breathe in water. And the same purpose will infuse interest into the examination of its means of locomotion, its colour, shape, and covering. In such processes as this *reasoning* will be developed. Indeed, the highest type of observation will be a species of scientific investigation. But the nature of reasoning must be reserved for fuller consideration in the next chapter.

All that we have been dealing with in this chapter is

sometimes called "the training of the senses" This expression, however, must be given a very wide meaning if it is to convey all that is meant by observation That process certainly does improve the child's powers of discrimination in the field of sense material. The child is able to distinguish finer shades of colour, smaller differences in weight, in length, in shape, and so forth, after exercises in observation. But much more than this is involved. What these observation lessons set out above all to provide is an improvement in the *use* made of the senses Left to himself, the child, however acute his sensibility, would not notice many things to which his attention is directed in the observation lessons of the school

"Let us remember . . . that in the case of the child the life of feeling and of impulse overwhelms for a long time the activity of the intellect, that the critical subordination of his fancies to the actual impressions is still to a great extent wanting, allowing us to surmise that the perception of the child is more emotional and personifying in character than theoretical and observing, that what he apprehends is borrowed more from the life of feeling and impulse and from his own world of fancy than from exact analysis of the properties of the things, grounded on earlier perceptions."[1] This closer observation is secured by the teacher's directions and questions, by the child's handling of the object under the guidance of those directions and questions, and by any other exercises—such as drawing, modelling, and even experiment—which the child is thereby or therein induced to undertake. The teacher thus acts as a guide to the child in the earlier processes of observation.

[1] Meumann, *Vorlesungen*, Band I., pp. 123-4.

"Just the same kind of thing holds good for the adult. When I wish to extend my observation over a sphere which until now has been relatively unknown to me, *e.g.* over art or farming, I obtain the help of a specialist in that sphere and get him to impart to me his general lines of observation. Then I try to go forward in original and new ways on my own account. But if I omit to obtain this guidance, I shall probably, even with long and fatiguing toil, fail to go as far as the specialist would take me in half an hour."[1] Now in the work of early observation, and with respect to any given object, the teacher is, relatively to the child, a specialist. By his questions and his remarks he can guide the curiosity of the child into fruitful channels, so that pleasure and profit may be the result.

This increase in knowledge is not possible by sense-perception alone. It depends throughout on the higher processes of ideational activity. As we have already seen, all processes of observation which rise above the mere handling and naming of things (and these processes alone deserve the name) involve the enrichment of "simple" perception by *abstract ideas.* For in such processes, the child uses abstract ideas which he already possesses to characterise or describe the fresh material perceived. He not only *perceives*, but *apperceives.* In doing this, he gains more definite knowledge of the material in question, he refines and strengthens the abstract ideas which he already possesses, and he often obtains new ones in the careful comparisons which he finds it necessary to make. Lastly, the higher forms of observation involve, or lead on to, that use of ideational systems which is known as *reasoning.*

To sum up, observation gives us a fuller and more

[1] *Op cit.*, Band II., p. 193.

precise knowledge of our environment, and at the same time it serves as a basis for higher intellectual development, whereby future situations will be dealt with more successfully

Questions on Chapter IV

1 Bring out the importance of movement in developing our knowledge

2 *What is observation? Distinguish a higher and a lower kind,* giving examples

3 What is the object of nature study as a subject in the school curriculum? Why should it develop into natural science as the pupil grows older?

4 Explain what is meant by *particular* and *generic* ideas as distinguished from *abstract* ideas

5 Why should a child be required to state clearly what he sees during an observation lesson?

6 What do you understand by the statement that handwork is a *method* rather than a subject? In accordance with your answer specify the place of handwork in the Time table of the School.

CHAPTER V.

IMAGINATION AND IDEATION.

Unlike the lower animals, man does not live almost exclusively in the world of perception, depending for the direction of his activity on the spur of the moment. He does not merely perceive and deal with the concrete situation in which he finds himself at each instant. He aspires to influence an environment of much wider extent. He "looks before and after." At a given moment, a man may be adjusting his conduct with a view to a situation which will not present itself until many years later, and in doing this he may be taking into consideration other situations which existed many years previously. In order to understand this wide-reaching character of man's conduct it is necessary to consider more carefully than we have yet done the higher forms of mental activity.

We shall first consider the origin and nature of *images*. We shall see that the image, like the percept from which it is derived, consists of two parts or aspects—the *sensational* and the *ideational*. The former may be called the *image proper*,[1] the latter the *idea* or *meaning*. We shall find that the *idea* is the more important element, and that

[1] In what follows the terms *image* and *imagery* will sometimes be used for this part only. The reader will readily understand by the context how the words are employed in any particular case.

when we go beyond those images which are mere reproductions of past experience (*i e* beyond what may be called *reproductive imagination*) to the construction of new combinations (*i e.* to those varieties of imagination which may be called respectively *interpretative* and *originative imagination*), ideas or meanings of a more or less abstract nature are still more important factors.

And in the highest intellectual processes to be considered (those which are usually called *reasoning*) we shall find that ideas, and the connections between them,—whether definite sensational elements are or are not still present —largely dominate the situation. In this connection, we shall note the increasing importance of those higher ideas which we have called *abstract ideas*. And after an attempt to trace the development of these ideas, we shall conclude with some further observations on the nature and importance of *reasoning*.

This brief sketch of our procedure, though at present somewhat meaningless for the beginner, may render what follows a little clearer for him than it might otherwise appear. Let us now begin with the simplest form of the higher mental processes—the *image*.

In many cases a person, after having perceived a thing, can "remember" or recall it, *i e* he can call up an *image* of it in his mind. The image is a more or less faint and vague revival of the percept. It involves the same cerebral excitations as the percept, though they are usually more feeble. But the process, instead of being started from without, is initiated from within, through some neurones which have become connected with those involved in the percept, and which, being for some reason excited, arouse the latter to excitement Thus, if the reader is asked to call up his *home*, a more or less vivid image is likely to arise in his mind. Or the thought of

his *mother* might also call up the same image. Images are thus called up by reason of associations which have been formed in past experience. As we have already seen, the whole of what is usually called *memory* depends largely on these connections.

Images can occur in connection with any of the senses, though they arise chiefly in connection with sight, hearing, and movement (under this last term being included all the sensations—tactual and kinæsthetic—occurring during movement). People differ very much in the vividness of their imagery. Some seem to have a preferred sense. Those who use visual imagery most are sometimes called *visiles*, those in whom auditory imagery predominates are known as *audiles*, while those whose images of movement are most frequent are styled *motiles*.[1]

Now the image, like the percept from which it is derived, consists of two parts or aspects—the sensuous element and the meaning: we have certain revived sensations and we *mean*, or refer to some object (which is certainly not the sensations).

One must not suppose that these two parts are distinguishable by us at the time. It is only by the psychologist, and even by him only after careful introspection, that they can be distinguished at all. Further, it should be remembered that what we now distinguish as the *meaning* is probably itself dependent upon the traces of many past sensuous experiences. These, however, are not now

[1] Recent researches seem to point to the fact that usually in a given individual there is not a very great difference between the richness of imagery derived from one sense and that derived from another. Many seem to have good imagery *all round*; and some, especially those who do much abstract thinking, seem to have poor imagery throughout, except, perhaps, for words (which may occur in any or all of the three forms of imagery mentioned above.

revived as individually separate elements They are probably faint traces of innumerable past experiences which have gradually lost their definiteness and individuality, being "boiled down," as it were, to a small concentrated and readily aroused residue, the function of which is to determine a core of meaning beneath those more definitely revived sensations which we have called the "sensuous element" Some people get very little of a definitely sensuous kind when they recall something to mind they merely *mean* the thing in question Since the sensuous element takes some time to arise a similar condition may be induced in the mind of almost everyone if meanings have to be passed by rapidly Thus, if a person is reading off a list of words such as *horse, cat, dog, cow, house*, etc, as fast as possible, he will usually get the meaning of each word with little if any imagery

The meaning, after all, is the most important part It is true that in the early percepts on which images are afterwards based the sensuous element is a necessary beginning But when once meanings have become established we can get on quite well without much of the sensuous filling out. Thus, if I tell two men that the channel passage will be very rough to day, one may have a vivid picture of the thing referred to, but the other may have little beyond the meaning Yet both may behave in the same way they may both decide to put off their journey

Meanings, then, form the essential framework of all our thought. And since, in addition to those more simple meanings which result from mere perception and which we have called particular and generic ideas, the child is soon able to mean or refer to aspects or parts of the wholes perceived i e to use *abstract ideas*, he is early capable both of giving and of understanding descriptions and narrations

As we have seen, he develops this power through observation, which gives him greater control over ideas, especially abstract ideas, and over the words which become so closely connected with them.

Let us consider what takes place in the mind of a child who is giving us a description or narration of something which he has seen. First of all, the question or request of the teacher suggests the whole thing or event to the mind of the child. Before the child begins to talk about it, it is a more or less confused whole in his mind. This has sometimes been called an *aggregate idea*. As the child talks, he is really breaking this whole up into parts, with the aid of further ideas. Some of these ideas may be vaguely present in the whole confused mass with which the child starts, and they become definite and clear one after another as he concentrates his attention on that mass. Many, however, cannot be said to be in any sense present at the start. They arise by virtue of associations formed in the past experience connected with the thing to be described.

The child says, for instance: *Three old women were walking slowly along the road.* It is obvious that a child cannot do this without using abstract as well as generic ideas. Those abstract and other ideas were used when the event was perceived; in other words, it was not merely perceived but *observed*. As a rule, the more careful our observation, the more accurate will be our description or narration. During the observation the various ideas are linked together by the process which has been called association. And when we commence our description or narration, one idea suggests another, and we are said to *remember* the whole thing. It is clear, then, that what is usually called *memory* depends on previous processes of *association*.

If our imagery is very vivid, we may, so to speak, ob serve during our description some points which were not definitely noted in the original observation But usually most of the points mentioned now were definitely observed at the time of the original occurrence

Now *all* the links between the ideas were not formed during the observation Before the event in question, there was already some connection between *old* and *slowly* and between *walking* and *road* Suppose that the report continues *One stopped to rest, two went on* In addition to the connection already existing between *stopping* and *resting*, we may take the whole of the statement made by the last three words as following necessarily from the previous statement The child in past experience has not only gained control of separate ideas, but of ideas in given relations to one another He has formed his ideas into various systems Some of these stable connections are exemplified in practically every new concrete presentation which he meets, and they help him very much in observing and describing To distinguish them from the associations which have to be formed on the spot, we may call them *thought links* [1]

[1] Thought links may be regarded as fixed and fundamental forms of association, as connections which have been indelibly established by reason of the fact that they correspond to the uniformities of nature. Such thought-links may not all have been formed during the life of the individual. They have probably been formed in great measure during the long course of evolution, the corresponding cerebral development having been inherited. "Those who contend that knowledge results wholly from the experiences of the individual, ignoring as they do the mental evolution which accompanies the autogenous development of the nervous system fall into an error as great as if they were to ascribe all bodily growth and structure to exercise, forgetting the innate tendency to assume the adult form." (Spencer, *Principles of Psychology*, § 207)

The immense aid which these thought-links give in the processes of observing and reproducing may be shown by the difference in facility with which one attacks something in which they cannot be used. It is partly for this reason that a narration is usually easier to give than a description. The former consists of a series of events more or less *necessarily* connected, *i.e.* depending for their connection on thought-links (*e.g.* of cause and effect) of which the individual is already possessed; the latter may consist of a number of points which have no necessary connection. The same difference exists between learning by heart a few sentences which "make sense" together and attempting to learn the same words arranged in haphazard fashion.

The more, therefore, we can get children to *understand* what they are required to reproduce, *i.e.* to bring out and apply the thought-links which are already developed in their minds, the more easily will the process of learning take place. A good memory, then, depends not only on the associations formed at the time of learning, but on the use made, where possible, of those deeper and more permanent connections which we have called thought-links.[1]

Such a process as we have sketched, in which something observed is afterwards narrated or described, is often called *reproductive imagination*. We have seen that, even if vivid images are aroused, the narration or description itself cannot take place without the aid of abstract

[1] Memory, then, depends upon effective cognition; when we understand something thoroughly we can remember it easily. And, on the other hand, cognition depends on a good memory. For to understand something means that traces of past experience are aroused. We see, then, that memory and cognition act and react upon each other

ideas,[1] and that, although vivid imagery may be of much assistance, the ideas or meanings and their connections are the most important elements

What now of the process which takes place in the mind of the child when he hears the teacher narrate or describe something? In this case, he starts by hearing sounds—the words of the teacher These words should call up, on account of previous associations, certain ideas Those ideas combine, variously modifying one another, to form new complexes, and these complexes should correspond to what the teacher has in mind But they will not do so unless the words which the teacher uses are already associated with the necessary ideas in the mind of the child. How important it is, therefore, for the teacher to take care that the words he employs are really known Teachers often complain of the stupidity of children, when in reality the fault lies in their own stupidity in failing to estimate the contents of their pupils' minds

Let us take an example Suppose the teacher wishes to describe the Crystal Palace to the children, and has no picture to show Suppose that all the children have seen Buckingham Palace The teacher may describe the Crystal Palace as a very large building like Buckingham Palace but made of glass, like a conservatory This, of course, assumes that they have seen a conservatory Even if the children have seen neither a conservatory nor Buckingham Palace, the words, *a very large building made*

[1] Young children are often apparently in this difficulty they "see again" all that they have perceived previously, but the poverty of their abstract ideas renders them unable to tell us about it. Adults, who can readily talk about what they have seen are apt to be impatient with the child who indicates that he remembers something but cannot describe it

of glass, may be fairly adequate. All the meanings involved modify one another and coalesce to form a new whole. But if the children have seen a conservatory and also Buckingham Palace, the images of these may help them considerably.

Such a process is a *form of constructive imagination*. Since it involves the interpretation or reception of the words of another, it is often called the *interpretative* or *receptive form*. Out of the images called up by the words employed, many of the children may construct a new image. Which parts of the images are selected and which parts are rejected will depend on the total meaning or system of ideas. Thus, if a definite image of a small conservatory at home arises in the mind of one boy, he will select the general appearance so far as it is due to the glass, but he will reject the size because of the meanings of the words *very large*. Similarly, if a definite image of Buckingham Palace arises, the size will be retained, but the material will have to be rejected. The system of meanings, then, forms a sort of sieve which catches certain elements of the images, but allows others to pass. In some few minds, especially among adults, the meanings may coalesce to form a new whole without much attendant imagery.

We have yet to deal with the play of fancy. This is the process for which the term *imagination* is exclusively reserved in popular speech. Having, however, used the word in a wider sense, we require to mark off this further variety by a distinctive title. It is, like the last, a form of *constructive imagination*. But since it involves new combinations arising through the activities of the individual, it is often called the *originative* or *creative* form.

Strictly speaking, there is nothing absolutely original or creative in this process. In the mental world, just as in

a source of much pleasure and profit. We are all delighted and inspired by the noble creations of art and literature. Although many of these creations are far from the realities of ordinary life, they often suggest to us things that might be, and lead us to strive for an improvement in our conditions; in other words, they give rise to *ideals*. And, once in this world of ideals, we begin to frame special constructions to suit our particular cases. And we often strive to attain them in real life.

The practical man and the scientist have need of this facility in originative imagination equally with the poet and romancer. Each of us finds himself at times in presence of conditions which cannot be met by any system of ideas which he already possesses, and thus experiences the need of making a new arrangement. If he has been accustomed to manipulate his ideas in the way described, he will be able to frame a number of constructions among which a satisfactory solution may be found. What in ordinary life we call tact and power of adaptation to changing circumstances involves some amount of originative imagination. And the scientist is largely dependent on the same process for the framing of the many hypotheses among which he hopes to find one which will prove a satisfactory theory or explanation of the phenomena examined.

This brings us very close to what is usually known as *reasoning*. The word *reasoning* is employed with somewhat varying signification. But a complete process of reasoning always includes some end in view and the framing or arousal of a system of ideas whereby that end is secured. The connection between the end in view and the construction of ideas is, however, a closer one than in originative imagination. In the latter process, the directive idea is only vaguely directive; it admits of many

forms of combination, it is often more satisfied by the sensuous wealth of the images than by the meanings or ideas accompanying the sensuous element, and in any case it is satisfied by the combination thus produced, it is not directly concerned with the question as to whether that combination represents *reality* Reasoning, however, is always a search for some form of reality not at the moment in our possession And the construction of ideas is consequently made not for its own sake, but as a means of arriving at some real or true result. Consequently our ideas have to be *necessarily* connected throughout The *thought links* of which we have spoken must exist at all stages Sensuous imagery, though it may be of assistance, is not an essential feature meanings and their implications are completely in the ascendant Originative imagination may thus assist by providing us with a great deal of material to work upon, but reasoning cannot take place unless some of this material can be selected because it points conclusively to the truth at which we desire to arrive

Now the realisation of necessary connections is only possible in the world of *abstract*, or as some call them, *universal* ideas As Aristotle said long ago, taking an instance from geometry, "it is clear that even if we had been able to perceive by sense that the three angles of a triangle are equal to two right angles, we should still have had to search for a demonstration, and should not, as some say, have known it scientifically, for we necessarily perceive in particular cases only, but science comes by knowing the universal" [1]

Some "practical" people might reply that in such cases as this it is quite sufficient to find that it *is* so, without

[1] Quoted by Bosanquet, *Essentials of Logic*, p. 154.

troubling to inquire *why*. But in many cases, as we shall see, the fuller insight which we get by rising to abstract or universal truth enables us to go on to many more results which we could never perceive by sense. It is quite justifiable to hold that science or abstract knowledge is of no use *in itself*. And Aristotle, in common with many other philosophers, was to some extent at fault in this respect. But the building up of systems of abstract ideas representing various aspects of the concrete world is not a mere intellectual pastime. Our systems of abstract ideas not only enable us to understand the world, but to turn its forces to our use.

This is the meaning of the statement, *Knowledge is power*. It is through the agency of science that man is gradually bringing the forces of nature under his control. Civilised nations are to-day served, as it were, by great armies of invisible slaves. The motto, *Proceed from the concrete to the abstract*, is not therefore complete. It should be coupled with the maxim, *Use the abstract to deal with the concrete more efficiently*. We soar into the abstract in order to gain a more efficient grasp of the concrete.

To trace the steps by which a child comes by his abstract ideas and gradually adds to them is a long and difficult problem. Perhaps no psychologist has succeeded in solving it completely. Most of these abstract ideas arise so gradually during the course of experience that it is impossible to trace definitely the course of their development. It is comparable to the attempt to see the act of growing in a plant. Still, we can examine some statements with respect to this acquirement which will throw a little light upon it.

Some of the older psychologists attempted to solve the difficulty very easily by merely assuming that we have the power of abstract thought, and that this gradually develops.

This is no better than to explain sleep by saying that we have the power of sleep. Yet there is some truth behind it. There is, at any rate, an innate tendency to abstract thought. Each of us inherits a brain which develops to some extent by itself. A dog, on the other hand, inherits a brain which, with all the attempts at education which we lavish upon it, will never allow of abstract thought.

But, left to ourselves in an environment which excludes intercourse with human beings, we should acquire very few of these abstract ideas The Wild Boy of Aveyron, when captured, possessed none, though he acquired some later under the care of M. Itard. And it is very instructive to read the following quotation from M. Itard's account of the process

"I was entering now into the field of abstractions, and I entered into it with the fear that I should not be able to penetrate into it, or that I should soon find myself stopped by insurmountable difficulties. There were none at all; and my first demonstration was seized at once, although it dealt with one of the most abstract qualities of bodies—that of extension I took two books bound alike but with pages of different size: one was an 8vo, the other an 18mo I touched the first. Victor opened his note-book [in which he had the words he knew], and pointed with his finger to the word *book* [He could not talk] I touched the second, the pupil indicated again the same word. I repeated the operation several times, and always with the same result

"I then took the smaller book, and, holding it to Victor, I made him spread his hand flat on the cover The latter was almost completely covered. I induced him next to do the same thing on the 8vo book; his hand scarcely covered a half of it. In order that he could make no mistake with respect to my intention, I called his attention to the part

which remained uncovered, and tried to get him to stretch out his fingers towards that part. This he could not do without uncovering a portion equal to that which he succeeded in covering. After this experience, which demonstrated to my pupil in such palpable fashion the difference in extension of these two objects, I asked again for their names. Victor hesitated; he felt that the same word could no longer be applied without distinction to two things which he had just found unequal. It was just to get him to this point that I was waiting. I now wrote the word *book* on two cards, and placed one of them on each book. I then wrote on a third card the word *large*, and the word *small* on a fourth. I placed these by the side of the first cards, one on the 8vo and the other on the 18mo book. After having caused Victor to notice this arrangement, I took up the tickets again, mixed them up for some time, and then gave them to him to be replaced. They were put back properly.

"Had I been understood? Had the respective meanings of the words *large* and *small* been grasped? In order to have both the certainty and the proof of it, I proceeded in the following way. I sent for two nails of unequal length. I had them compared [by Victor] in almost the same way as in the case of the books. Then, having written on two cards the word *nail*, I gave them to him without adding the two adjectives *large* and *small*, hoping that, if my preceding lesson had been thoroughly grasped, he would apply to the nails the same signs of relative size which had served him in establishing the difference in dimension of the two books. He did it with a promptitude which made the proof all the more conclusive. Such was the procedure by which I gave him the idea of the qualities of extension. I employed it with the same success to make intelligible the signs which represent the other sensible qualities of

bodies, such as those of colour, of weight, of hardness, etc."[1]

This is an admirable illustration of what takes place more gradually, and less systematically, in the formation of many of our abstract ideas. To sum up, we may say that there is *observation* of things, involving *comparison* of them. In this comparison, *differences* are singled out for special attention. And the employment of *words* for the points of difference enables the mind to grasp them more readily

But comparison also involves the noticing of *likenesses*. And in some instances we arrive at abstract ideas most readily in this way. This is especially the case with the more difficult abstract ideas, those, for instance, of relations. Thus the idea of *inferiority* could be brought out by comparing the relation of a child to his father with that of a soldier to his captain, and with that of the captain to his colonel, and so on.

In many cases, however, both methods can be employed. And in bringing out new ideas clearly in school, the teacher should often use both Thus in a lesson on *porosity*, he will cause the children to compare a porous body (sugar) with a non-porous body (marble), by immersing each partially in water. (The essential nature of the difference could be made clear by taking a coloured liquid and lowering into it two glass tubes, one of ordinary calibre the other a capillary tube. In the latter, the liquid will rise) This is the *method of difference* Note that the singling out of the difference which it is desired to teach is rendered more easy when the things compared are alike in other respects In the case just cited, for instance, both the substances are white and hard. Further, the pieces used

[1] Itard, *op. cit.*, pp. 86-7.

might be of the same shape. (And if the two tubes are used, they may be of the same length.) But the quality of porosity will be grasped all the more clearly, if comparison is made of a number of things which are alike in possessing it, but which differ in many other respects. Thus sponge, blotting-paper, chalk, cloth, cane, sand, and lamp-wick could be dipped in liquids. This may be called the *method of agreement*.

To take another example, the essential properties of a square will be brought out clearly if it is compared with other figures drawn about the same size and with only a few sides, such as a triangle, a pentagon, an oblong, a rhombus and a rhomboid (method of difference); then many different squares may be presented—a large one, a small one, a black one, a white one, a green one, and so on (method of agreement).

This last example deserves attention from another point of view. A square is a figure enclosed by four straight lines, and with right angles for its corners. We see, then, that the complete abstract idea of a square is not *one* idea, but a combination of several. So with all classes of concrete things.[1] Such a combination of simple abstract ideas representing the essential features of a class of things is often called a *concept*, and the statement of it in words is known as a *definition*. It is obvious that we must acquire a good stock of simple abstract ideas of the various properties of things before we can attack the problem of framing concepts and their corresponding definitions. Consequently we should not be in a great hurry to get definitions from young children. We should remember that in the early stages they have only *recepts* or *generic*

[1] Except those very artificial ones which we make in thought by taking one quality only as the essential, as when we speak of all *white* things.

ideas, i e they recognise and distinguish things by perception of them *as wholes* And in a great many cases these recepts are quite satisfactory for ordinary purposes It is only when we have to be very exact, when we come to reason about things, in other words, when we soar into the realm of science, that we need to distinguish the various classes of things by means of these abstract ideas

The more or less vague reference to a class of things, implied in the recept, does not disappear with the formation of the concept We not only think of a number of qualities, but of the class of things possessing those qualities There is not only *abstraction* but *generalisation* A general term, therefore, has two meanings it means the essential attributes of the class, and it also means the class itself The first meaning is often called the *connotation*, the second the *denotation* The *connotation* is thus what we have previously called the *concept*, the *denotation* is what has been already termed the *recept* The two together may be spoken of as a *general idea*[1]

Now if a person already possesses all the separate abstract ideas which go to form a general idea, it is possible to give him that general idea by merely reciting to him the definition He thus obtains a more or less clear idea of something which he has never seen or observed This

[1] This term should be carefully distinguished from *generic idea* A *general idea* is a concept as well as a recept, a *generic idea* is only a recept. Very young children (those under six) have few *general* ideas though they have many *generic* ones. Their meanings are in *denotation*, not in connotation Thus, when a young infant is asked what a *chair* is, he can do no more than point to one. But if a normal child of six is asked the same question, he will usually attempt some sort of a definition, he will say that a chair is "what you sit on," or some such thing His meanings are beginning to be in *connotation* as well as in denotation In other words, many of his *generic* ideas are beginning to develop into *general* ideas.

is often done with adults. And it is a very speedy way of imparting knowledge. But it is very unsafe. If it is to be successful, the person so instructed must have a thorough grasp of abstract ideas, much experience in using them, and a clear understanding of the relation between the concrete and the abstract. Even then it usually requires to be supplemented by dealing with concrete instances. When it is so employed, it is often called the *synthetic* or *deductive* method of teaching. The pupil builds up the new concept out of ideas already possessed, and then applies his knowledge by dealing with some actual concrete cases. With children, however, it is usually best to adopt the reverse order. We present the concrete *first*. Observation takes place, as we have described it. The comparisons which occur enable the children to single out the essential features. And when they have done this, they attempt to frame their own definitions (which may have to be corrected, or polished up by the teacher). This is called the *analytic* or *inductive* method. But it can, and should, be followed by deductive application, as in the former case.

It is interesting at this point to note the difference between *description* and *definition*. In both cases we use abstract ideas. But in the former we are concerned with getting our hearer to imagine a concrete thing, and we consequently *refer* to all the qualities which enable him to form a complete picture. If we are describing a thing to a person who already has the general idea of the class of thing in question, we shall not refer to the essential properties of the class, but rather to the "accidental" properties possessed by this particular member of the class. Thus in describing a square field, one would merely say that it was square, and then go on to speak of its size, its vegetation, its position. But in definition we are not

means of a map, so an individual is able to find his way about in new portions of concrete experience by means of his systems of ideas. If each of us could be suddenly bereft of all abstract ideas, he would be no more able to deal with the complex situations of civilised life than an animal. He would merely *perceive* things, not *apperceive* them.

The dealing with some *new* situation, finding our way onwards by means of our "plan" is what is known as *reasoning*. This is not so easy as it appears when stated thus simply. For we have *to hit upon the particular part* of our "plan" which will help us in each new situation. And in some cases the "plan" is found inadequate, and requires to be further developed (by additional observation or experiment). Such cases are usually referred to as *inductive reasoning*, the other kind being styled *deductive*. But in both cases the essence of reasoning consists in selecting and using some part of the ideational "plan" we already have (whether that "plan" requires some completion or not) to deal successfully with a given situation.

It is necessary to distinguish *deductive and inductive* REASONING from the *deductive and inductive* METHODS OF TEACHING (see p. 72). The latter are *both of them* methods of adding to the child's stock of general ideas (the *inductive* method being usually the safer plan). In teaching *deductively*, the instructor first defines the general idea or general law, and the pupils apply it straightway to certain concrete instances. In teaching *inductively*, the teacher presents certain concrete instances, from observation of which the pupils are led to conceive the general idea or general law. In both cases *the teacher is guiding the process*. It is only in so far as the *whole matter* is carried out by the pupils themselves, *under the influence of their own directive ideas*

(whether those ideas require completion or not), that *reasoning*, in the true sense, occurs

In such cases the teacher is said to be adopting the *heuristic method*, though it is really the *pupils* who are doing the work, the teacher's part is to see that the problem is one which interests the children, to ascertain that it is not beyond their powers, and finally to encourage (without directly helping) the pupils in their labours "All teachers who realise that learning is the work of the learner which cannot be performed vicariously, and all students of childhood, are bound to acknowledge the high importance of placing the learner in the position of the discoverer of truth ... But 'Art is long and time is fleeting,' and it would be unwise, even if it were possible, to refuse to employ in the instruction of a child knowledge already garnered and ready for his use."[1] The *heuristic method*, therefore, cannot always be employed. The child cannot himself make many of the scientific discoveries with which it is nevertheless necessary that he should be acquainted. The chief employment of the *heuristic method* in schools will, therefore, be in *deductive* ways. The child should frequently be induced to tackle problems which can be solved by means of the ideas he already possesses, if only by due attention and effort he succeeds in hitting upon those ideas which are relevant to the case in point. This, of course, is frequently done in arithmetic. But the same "problem method" could be employed more frequently than it is in geography, history, and even at times in literature.

Often, however, practically the same situation recurs again and again. We are then able to deal with it more or less mechanically as in simple perception Thus a boy

[1] Adamson, *The Practice of Instruction*, p. 46.

suspect the examiner of malicious intent But if the examiner desires to test the boys' powers of *reasoning*, this is exactly what he must do And the teacher should prepare the boys by precisely similar means

One reason why boys produce such poor results when left to deal with problems by themselves is that the problems are so uninteresting And the boys never really attend to them with sufficient keenness to understand what is wanted This is evidenced by the absurd answers which many of the boys produce—answers which would *at once* appear ridiculous to a person who really appreciated the nature of the problem Our problems should as far as possible deal with life—especially with the lives of the boys It has been suggested by some writers that especially with the younger children all arithmetic should be taken in connection with practical work, should in fact, grow out of the things which the children are doing as it does in the work of the world. Even if this is impossible to a large extent, a great deal can be done in the way of framing interesting problems and *getting the boys interested in them*

Space will not permit us to deal, even in this cursory fashion, with reasoning in other subjects But in all of them similar principles hold The children should be encouraged in *self activity* They should not be more or less passively following the teacher, but should be actively working out problems which they feel to be their own

QUESTIONS ON CHAPTER V

1 What do you understand by *originative* imagination? Give some instances of it which might occur in school

2. Why should the teacher attempt to develop the imagination of his pupils?

3. What is a definition? Why is it not advisable to ask very young children for definitions of the words they use? How could you be sure, without asking for definitions, that the children understand those words?

4. The words *man*, *dog*, *boy*, may occur in my mind both during a process of *imagination* and during one of *reasoning*. What difference would there probably be in the ideas arising in connection with them?

5. What is meant by the "inductive method" in teaching, and to what extent is it analogous to the process of scientific discovery?

6. Finding that a class is weak at problems, though good in ordinary calculation, what steps would you take to remove the weakness?

CHAPTER VI.

INSTINCT AND HABIT.

Up to the present we have been concerned principally with *cognition* or *knowing* We have tried to keep in mind, however, that its only value is for behaviour We may, indeed, go still further, and declare that cognition itself is behaviour. It is a form of activity. The man who thinks is often working harder than the man who is doing manual labour. Both processes require the expenditure of energy. And both lead to what we call *fatigue* when they are prolonged. In one case, it is chiefly the brain which is fatigued; in the other case, the muscles.

We may say, then, that not only do we learn by doing, but that learning is itself a form of doing. All the mental processes which we have been studying could not go on without an inner force pressing forward. This force has been variously named. Some have called it *will* But this word is used with varying signification by different psychologists. Some have called it *attention.* But this again is used in different senses. Perhaps the best word to use is *conation.*

Conation, then, may be regarded as the most fundamental constituent of all conscious activity. Cognition only arises and develops in its service. Percepts and ideas are methods of grappling with given situations They involve tendencies to go on with our life in certain directions Or they may be considered as so many differentiated

given stimulus take varying courses according to the structure and organisation of the nervous system. But that structure and organisation can not only determine the course of an impulse but the magnitude of its effects. Just as a given individual may receive a warm welcome in one house, with much consequent excitement and activity, but a very cold one in another, scarcely any "fuss" being made of him, so a given stimulus may lead to very active responses in one individual, and to few if any in another.

A mother will often start out of her slumber at the feeblest cry from her baby, though she is not disturbed by much louder noises Her nervous system is so organised that it responds in a particularly vigorous manner to sounds and other stimuli coming from this child. She was not born with these arrangements in her nervous system, but they have developed later in life, just as a tree brings forth flowers and fruit after some lengthy period of growth. They can therefore be called *innate* or *congenital* (though in this case they are deferred for a time). If a woman had neither children nor other creatures to fondle, these special arrangements would be little utilised and would tend to die out for lack of use. Such a system of connections, together with the tendency which it involves to respond in a certain way to certain impulses, is called an *instinct.* This particular instinct is called the *parental instinct.*

Human beings have a large number of instincts, though few are present ready-made at birth. We shall presently enumerate the more important instincts. Meanwhile, it will suffice to point out that a great deal of our behaviour—both that which involves more especially thinking and that which involves much bodily movement—is due to the instincts which we possess We respond to certain stimuli and neglect others because "we are made that way."

But this does not account for the whole of an individual's

channels through which conation flows and which it has worn out for itself. Without them, of course, conation would be a poor thing. It would be nothing but a blind craving. It might be very powerful, but it could achieve little, because of its lack of organisation. It would be like the steam-power which has no delicately constructed machinery to set in motion. To achieve great things in industry we must have both motor power and machinery. One is of no account without the other. So with the human being. He must have conation, and that conation must be controlled and directed in certain ways.

In the preceding chapters we have been considering the cognitive aspect of processes which are throughout animated by conation. We have, as it were, examined the machinery in action without paying much attention to the forces which are responsible for that activity. It now becomes necessary, therefore, to examine more closely the springs of that activity.

We have seen that all mental activity involves corresponding nervous activity. The foundation of the activity of the human body is a fund of energy stored up in the nervous system, ever ready to be liberated when "touched off" by some stimulus. The impulses produced take varying courses according to the structure and organisation of the nervous system. Conation, therefore, depends largely on the state of the body. A healthy vigorous person is capable of more activity than an unhealthy and feeble one.

But the vigour of a person's activity does not depend merely on his health and strength. A healthy boy may be very slow in cleaning a pair of boots, but very smart and energetic in a game of football. In other words, he responds more vigorously to certain stimuli than to others. Why is this?

We have already seen that the impulses produced by a

given stimulus take varying courses according to the structure and organisation of the nervous system. But that structure and organisation can not only determine the course of an impulse but the magnitude of its effects Just as a given individual may receive a warm welcome in one house, with much consequent excitement and activity, but a very cold one in another, scarcely any "fuss" being made of him, so a given stimulus may lead to very active responses in one individual, and to few if any in another.

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But this does not account for the whole of an individual's

behaviour. Let us take another case. In a restaurant one night a waiter fell asleep. A number of young men shouted various names at him such as "Smith!" "Brown!" "Robinson!" But he responded to none of them. At length one of the party used another word. He spoke far less forcibly than in the case of the first names. But the moment he enunciated the word "Waiter!" the man sprang up as if shot. Now we cannot speak of a definite *instinct* in this case. Nobody is born a waiter. Yet the readiness of the response points to a system of connections quite as strongly organised as an instinct. In this case, however, they have been formed during the lifetime of the individual, through frequent repetition, as was explained in dealing with *association*. Such a system of connections with its tendency to produce behaviour of a certain kind in response to certain stimuli is called a *habit*.

Now according to Professor James, "Ninety-nine hundredths or possibly nine hundred and ninety-nine thousandths of our activity is purely automatic and habitual, from our rising in the morning to our lying down each night. Our dressing and undressing, our eating and drinking, our greetings and partings, our hat-raising and giving way for ladies to precede, nay, even most of the forms of our common speech, are things of a type so fixed by repetition as almost to be classed as reflex actions. To each sort of impression we have an automatic, ready-made response."[1]

This is probably a somewhat exaggerated statement. But even if it is only partly true, it emphasises the extreme importance of cultivating good habits and endeavouring to destroy bad habits in children. For youth is the time of plasticity. The habits formed then are likely to remain,

[1] James, *Talks to Teachers*, pp. 65 6.

becoming stronger and stronger, throughout life It is on such grounds as this that character has been called a bundle of habits

But the statement of Professor James seems to conflict with the statement lately made to the effect that "*a great deal* of our behaviour is due to the instincts which we possess" How can the greater portion of our behaviour be ascribed in one place to instinct, in another to habit? This can only be done if habit and instinct overlap in some way And that is precisely what is the case

When we begin life, we have no habits This is obvious from our definition of habit We have, it is true, few instincts But many develop rapidly as time proceeds Fear, anger, self display, self abasement, imitation, curiosity, play, and the tendency to handle and manipulate things soon show themselves Now an instinctive action is called forth under certain circumstances Thus a strange face may cause fear, interruption in what one is doing may arouse anger Such circumstances are continually recurring, and the instinctive actions aroused by them are consequently repeated But the repetition of any series of actions tends to fix that series, it becomes a *habit* We see, then, that our instincts themselves become habits Viewing these habits from the point of view of their foundation, we may call them instincts But since, when they become fixed, so much of their stability is due to repetition, we may still continue to call them habits From one point of view they are instinctive, from the other habitual We may therefore use a term coined by Lloyd Morgan, and call them *instinct habits* It is thus that we can reconcile our own statement with that of Professor James

But these instinct habits are not merely fixed forms of the congenital tendencies on which they have been founded In the course of their development, the instincts are more

or less profoundly modified by the particular nature of the experience through which the individual passes. In addition to this, other habits can be formed more or less independently of the instincts. Both kinds of change are largely due to the same causes—to the pleasure and pain experienced by the individual in the course of his responses. Pleasure and pain make us more selective in our activities; they consequently sharpen the intelligence; and this co-operates with them, both to produce various modifications and combinations in the instinct-habits and also to set on foot other habits. Those habits, however, which are largely based on strong and lasting instincts are usually the most powerful. And it is therefore important that we should make a survey of the instinctive elements out of which so much of our behaviour is elaborated.

Mr. McDougall, one of the greatest authorities on this matter, divides what are usually called instincts into two classes—(1) *instincts proper*, and (2) *innate tendencies*. According to him, what are properly to be called instincts are distinguished each of them by a special kind of emotion or excitement, and also by a characteristic form of movement. The movements for each of these instincts, including as they do facial expressions, have often been depicted by artists, and some of them are frequently produced artificially on the stage.

Nobody has ventured to give a complete and final list of all the instincts. And no claim is here made either to exhaustiveness or to absolute correctness in enumerating the following

INSTI[illegible]

(1) *The instinct of fli*[illegible] — [illegible] is more usually referred [illegible] f its ing emotion, *fear*. A

Education endeavours both to rid the child of unnecessary fear and to make use of the instinct in other cases as an inhibitor of undesirable tendencies. It achieves the former object by making the child familiar with the *cause of his dread in those cases where clear understanding* demonstrates the harmlessness of the thing in question. And it uses fear in various forms of punishment and threatening. The child can escape the punishment by avoiding certain undesirable forms of behaviour. Needless to say, we only resort to the production of fear in extreme cases where nothing else can be done.

(2) *The instinct of repulsion.*—Like the last, this is an aversive tendency. Its corresponding emotion is *disgust.* In its primitive form, it involves the rejection from the mouth of noxious and evil-tasting substances, and the shuddering aversion from slimy and slippery things. In the course of development, however, ideational complexes as well as perceptual come to excite it. Thus the actions, speech, or general character of a man may cause our disgust. The teacher can make use of such facts in connection with the moral education of his pupils. Evil characters (especially in history and literature) can be so shown up against the background of noble characters that the disgust of the children can be strongly aroused.

(3) *The instinct of curiosity.*—This is an appetitive tendency: its impulse is to approach and to examine more closely the object which excites it. The accompanying emotion is called *wonder.* The object must be unfamiliar. Not, however, so unfamiliar that it causes fear. It must be partially familiar, partially unfamiliar. Sometimes the degree of unfamiliarity is such that an object excites fear
V and curiosity in rapid alternation. "Who has not seen a horse or other animal alternately approach in curiosity, and flee in fear from, some such object as an old coat upon

expressions of anger will disappear; the energy of the instinct tends to reinforce the impulse of the moment, whatever it may be, and so helps the individual to make greater efforts to overcome difficulties.

(5) *The instinct of self-assertion or self-display.*—The accompanying emotion is *elation*. This is a *social* instinct: it presupposes spectators. In its higher forms it involves self-consciousness, and is known as *pride*. But it can be noted long before self-consciousness develops. Even the more intelligent of the lower animals show signs of it. "Perhaps among mammals the horse displays it most clearly. The muscles of all parts are strongly innervated, the creature holds himself erect, his neck is arched, his tail lifted, his motions become superfluously vigorous and extensive, he lifts his hoofs high in the air, as he parades before the eyes of his fellows."[1] The young child's showing-off before the admiring gaze of his elders and his repeated commands, "See me do this," "See how well I can do that," are expressions of the same tendency.

This self-assertion is one of the most imperious demands of our nature, and it is a cause of much of our most persistent endeavour. We shall see that it is one of the factors in what is called *emulation* or *rivalry*. The teacher, therefore, should not check it brutally, but rather utilise it to lead the child to make efforts in desirable directions. It need only be checked when it conflicts with the development of other members of the community.

(6) *The instinct of self-abasement.*—This instinct is accompanied by the emotion of *subjection*. It shows itself "in a slinking crestfallen behaviour, a general diminution of muscular tone, slow restricted movements, a hanging down of the head, and sidelong glances."[2] Such

[1] McDougall, *op. cit.*, p. 62. [2] *Op. cit.*, p. 64.

behaviour is evoked by the presence of some fellow creature who is regarded as superior to oneself

The teacher is constantly making use of this instinct, though he may not be distinctly aware of it He appears as a creature bigger, stronger, and wiser than the child, and the latter, in spite of self assertive and other tendencies which manifest themselves from time to time feels himself greatly inferior, and is disposed to subjection and obedience And at a time when the child is unable to think and to choose wisely for himself, it is right that the teacher should make full use of the power thus conferred on him

A training college student was once being interviewed with respect to her fitness for appointment, and it was noted that she had an excellent mark for discipline She was asked how she managed to obtain such strong control of her classes Her reply—due probably in part to nervousness—was, "I don't know" She was however, indicating a fact of great importance. Her personality was such that children listened to her, and did what she told them "quite naturally" In other words, she had plenty of self assertion, and this evoked a due amount of subjection in the children

Few teachers are able to control in this easy manner Those students however, who have little self assertion, who find children continually in opposition to them, would do well to question seriously their fitness for the teaching profession It is not meant that self assertion is the only essential qualification of the teacher Intelligent preparation of lessons so that the children are really interested, is even more important The kindness and sympathy born of a lively personal interest in the children will effect a great deal But even here, so far at any rate as the ordinary elementary schools are concerned, "the

affection which is based upon a wholesome awe is that which the master should seek to inspire."[1]

(7) *The parental instinct*, with its *tender emotion*, has already been referred to earlier in this chapter. It was there noted that this instinct is deferred to a comparatively late period of life. It shows itself, therefore, only in partial and incomplete forms in children. But something like it is induced by imitation. And if, as McDougall affirms, it is at the root of all tendencies which exhibit love and tenderness, such as generosity, gratitude, love, pity, benevolence, moral indignation, and even the passion for justice, it is important that the school atmosphere should be one of kindly consideration and sympathy, so that all the scholars may catch something of this spirit.

(8) *The gregarious instinct* prompts individuals to seek the society of their fellows. It is no doubt very strong in some cases, and may be cited as one of the motives which induce a child possessing it in a high degree to come to school. The separation of a child from his comrades, though indeed wounding him in other ways, involves some pain on account of the deprivation of fellowship which it necessitates. But the strength of this instinct varies greatly. There seems, indeed, to be an opposed instinct, which Professor James calls *secretiveness*. This is so highly developed in some cases that sociability seems almost impossible. Where this is the case, it is well to do all in one's power to increase the attractiveness of social communion. For there is no doubt that our best qualities can only be evoked through fellowship.

(9) *The instinct of acquisition* takes various forms, and is hence variously named. It is sometimes called the *sense of ownership*: at other times, the *collecting instinct*.

[1] Keatinge, *Suggestion in Education*, p. 81.

Both of these forms can be utilised by the teacher. When we consider a thing our own, we usually take more care of it than we should otherwise do. The children may be led to regard the class-room and its apparatus as their own, and thus to become keen on keeping everything at its best. Each individual may be given a particular reading-book of each kind in use, with his name stuck on by means of a label He may thus be induced to take a special pride in his books. Obviously the instinct of self-display will also be helpful here

The collecting form of the instinct may be directed to the acquisition of specimens, pictures, stamps, and so forth It will thus initiate a valuable series of habits which may go far to increase the child's interest in various subjects of the curriculum (e g nature-study, history, and geography), and thus materially aid the intellectual side of his education.

The instinct may also be evoked *with moderation* in connection with money, the child being induced to begin to save small sums (though not *all* his coppers) and thus to form a habit of *thrift*. But, if it is concentrated almost entirely upon money and other valuables, the child being encouraged to hoard up every penny he obtains, it may lay the foundation of *avarice*, and even give rise to *kleptomania*. This is a good illustration of the truth already hinted at, viz. that every instinct has its place and can be useful under certain conditions, but that the inordinate development of one or more of these tendencies leads to habits which are harmful to society.

(10) *The instinct of construction* is very prominent in most children. Long before they come to school, children show an impulse to make things, though the things be only mud pies, or toy houses and bridges. This instinct should be further employed in school. The various forms

of handwork give it exercise; in them "*constructiveness* is the instinct most active; and by the incessant hammering and sawing, and dressing and undressing dolls, putting of things together and taking them apart, the child not only trains the muscles to co-ordinate action, but accumulates a store of physical conceptions which are the basis of his knowledge of the material world through life."[1]

Closely connected with, and perhaps not to be definitely distinguished from, the instinct of construction, is the *instinct of manipulating objects*, which is also difficult to distinguish from some of the more general innate tendencies which we shall presently deal with, especially from the tendency to play and the still more general tendency to bodily activity. It is this instinct of manipulation which leads a child to take things to pieces, and often to commit what appear to be wanton acts of destruction. There is no doubt that the instinct of curiosity often co-operates with it.

There are a number of other instincts, such as the *sexual instinct* and that of *feeding*. *Sucking, walking, crying, smiling,* and many others are included by James in his list of human instincts. But space will not permit of any further treatment of the instincts here. We accordingly proceed to what Mr. McDougall has called

Innate Tendencies.

These are more general congenital tendencies which affect all our activites, including the instincts. They can thus become moulding and directing factors of great importance.

(1) *Imitation.* Imitation is a most widespread ten-

[1] James, *Talks to Teachers*, p. 146. See also Ch. IV. above.

dency, not only throughout the race, but throughout the activities of any given individual Its importance as a factor in education can scarcely be over-estimated. Our speech, our dress, our manners, our thoughts, and even our emotions are largely due to it In these and other spheres a very large share of the habits we form is due to the influence of imitation If an English child is brought up in France he becomes a Frenchman. If he is reared in a middle-class family he becomes a *bourgeois*, if in a slum home, he is likely to become an *apache*. The exact amount we owe to heredity is in the present state of science problematical. But it is patent to all keen observers that imitation of the thoughts, feelings, and actions of those around us, especially during the plastic period of youth, is a most potent factor in education. It must be remembered, too, that we not only imitate our pastors and masters, but our fellows. Hence the justification of those parents who are at least as particular about the type of child in a certain school as about the type of teacher.

We have used the word *imitation* in a very general sense But it takes three fairly distinct forms: (*a*) imitation of the *emotions* of those around us may be called *sympathy*; (*b*) imitation of *thoughts* may be called the giving way to *suggestion* and the propensity to it is called *suggestibility*; (*c*) *imitation* of *actions* has no special name and may be called *imitation proper* or merely *imitation*.

(*a*) *Sympathy*. The primitive sympathy to which reference is here made includes none of the higher moral qualities usually connoted by the term. It is, indeed, an element of the higher forms. But it is not to be confused with them It shows itself on the perceptual plane, and requires little ideation or imagery to account for it. It is

well known that if one animal in a herd of wild beasts shows fear and rushes off in flight, the others may follow suit. This does not necessarily imply that they perceive the same thing. All that is necessary to account for it is that the instinct of flight and its emotion of fear are capable of being excited not only by certain unfamiliar objects, but by the perception of manifestations of the emotion in other members of the same species. Thus emotion is "catching."

The sympathetic spread of emotion occurs in the same way among children. We often call it the "sympathy of numbers." The "tone" of a class or school depends largely on the same thing. The intelligent teacher knows that if he can obtain the emotional attitude he desires from the majority of his pupils, the others are likely to be similarly affected. At the same time he is aware that a marked departure from this attitude on the part of one or two individuals, especially if those individuals have strong personalities, may spread to many of the others. Accordingly he endeavours on the one hand to keep the majority in sympathy with him, and on the other to concentrate his influence on the one or two "dangerous" members of the class, so that they are unable to withstand the force of his stronger personality.

Many young teachers fail to understand the true position. They imagine that by wholesale coercion they can force the whole class into the proper attitude. They fail to see that they are running the risk of evoking a spirit of angry rebellion, which may spread like wildfire through the whole class, and turn even the most well-meaning boys into enemies of the teacher's authority.

(*b*) *Suggestion.*—The word "suggestion" is used with varying meanings, even within the realm of psychology. It is sometimes used to indicate the recall of something to

mind One thing tends to recall or "suggest" another which has been associated with it on a previous occasion

This is not the meaning to be given to the term in the present instance *Suggestion* is here used to designate the process whereby one person is led to believe something, and often to act upon it, without any definite grounds for the belief, but merely on the statement, or under the influence, of some other person.

We all have some suggestibility, *i e.* an innate tendency to believe what we are told, or what is otherwise indicated to us by certain persons The degree of suggestibility varies from one individual to another, and in the same individual at different times Persons in whom the instinct of subjection is much stronger than that of self-assertion have usually great suggestibility. But most of us experience subjection when under the influence of certain persons or institutions.

This kind of suggestion is called *prestige suggestion.* Connected with it is the fact that in many subjects our knowledge is deficient, or poorly organised, so that we are only too ready to accept the statement of some recognised authority. Now children are normally in this position with respect to adults, especially with respect to those placed over them—their parents and teachers And these have a right to use the suggestibility of the children in the interests of morality, impressing precepts and maxims upon their minds long before they can arrive at the stage when the reasons for these things can be understood.

It is to be remembered, however, that the person who wishes to exert this power over the children must be highly respected. The man of weak personality will do far less in this matter than the strong teacher; he may, indeed, produce an effect quite the reverse of what he intends

For there is such a thing as *contra-suggestion*. When the boys do not feel the superiority of the teacher, their self-assertiveness may take the form of believing and acting upon the direct contrary of his teaching. It is dangerous, therefore, to preach overmuch. For such reasons Mr. Keatinge advises the introduction of suggestions in an indirect fashion. The boys will not be so much on the alert to withstand them when their minds are bent on studying the material containing them from another point of view. Thus when a boy is writing a moral maxim as an exercise in transcription, the "new ideas can be introduced so discreetly that no reaction is aroused, that sleeping dogs can be let lie, and the subject remain sublimely unconscious that he is being 'got at.'"[1]

While suggestion is a worthy instrument in cases like those specified, it should not be used in such subjects as science, history, geography, and arithmetic. Here the teacher's aim should be to induce the children to investigate and to come to conclusions for themselves, and an attitude of passive acceptance of all that their teacher tells them is fatal to progress in this respect. Questions suggesting an answer of a certain kind (right or wrong) should as a rule be sedulously avoided.

Teachers who have a mind for experiment and who wish to assure themselves of the dangers indicated could produce startling results by using suggestion in this way, and requiring the boys to write down their answers. Show the class, for instance, the portrait of a man without any hat on. Give *only a few moments* for the examination of it. Then remove it from observation and ask: "Had he a *straw* hat, a *bowler* hat, or a *high* hat?" The number of wrong answers will probably be much greater than

[1] Keatinge, *Suggestion in Education*, pp. 76, 77.

would be the case if the question asked had been, "Had he a hat on or not?"[1]

(c) *Imitation* —We use this term, as already indicated, to signify the copying of the actions, manners, and general methods of procedure of other persons It begins as a sub-conscious tendency Thus the child automatically copies the speech of those around him, and most of us retain to the end of life the pronunciation which we heard in our infancy Hence the need of a good speech atmosphere, both at home and at school A higher form of imitation is that in which we definitely note the specific actions of others and then find ourselves imitating them The *idea* of the action issues almost automatically in the corresponding movement When the imitation is definitely deliberate, as when we *decide* to copy some model which we admire, the highest form is reached

Imitation is the means by which we acquire skill in many departments of activity In speech, gymnastics, writing, drawing, and general deportment, as well as in sports and playful activities, it is usually the predominant factor The chief recommendation to make is that the models should be good, and should be clearly presented to the children The teacher should bear in mind that his actions are being constantly watched, and that the necessity of setting a good example in *all* the details of his procedure is paramount.

(2) *Play* —In the past, many people looked upon the tendency to play as an unnecessary evil to be reduced to the smallest possible minimum Now, however, it is recognised as an innate tendency which must be given full scope if normal development is to occur Play is of

[1] In an actual experiment *all* the children replied correctly to the latter question whereas 80 per cent. answered wrongly when the question was "What sort of a hat?"

course, a form of recreation. It enables the individual to recover from the effects of work when he is not so fatigued as to require complete rest. And it is indulged in by the old as well as by the young. But to the very young child it is everything. And the early lessons in the infant schools appeal to it continually.

As time goes on, however, the teacher gradually requires the children to give attention to many things to which they would never attend spontaneously. But, even when the more serious work is in progress, something of the spirit of play may still be aroused: the impulse to *emulation* or *rivalry* can be utilised.

This impulse is often referred to as a distinct elementary instinct. It is more probably a development of the tendency to play, incorporating elements from some of the other tendencies already mentioned. Thus it contains something of the instinct of self-display, and still more of the instinct of pugnacity. Professor James emphasises the element of imitation. He even goes so far as to say that emulation springs out of imitation. There is some truth in this. But imitation alone cannot account for it. We *begin* by imitating others. We *go on to* emulation of them. And in this the instincts of self-display and of pugnacity must be recognised as important factors.

Many teachers fail to appreciate the extent to which this impulse can be used. It is admitted that rivalry is the soul of sport. But some think that it should be reduced to a minimum in work. Professor James, however, declares that "nine-tenths of the work of the world is done by it."[1] Though this may be an exaggerated statement, it serves to call attention to the extreme importance of emulation as a motive.

[1] *Principles of Psychology*, Vol. II., p. 409.

Some teachers make the objection that, when competition becomes very keen, it leads to envy and hatred, and, further, that the boys who always get beaten must soon lose heart But competitions need not always be between boy and boy Section can be pitted against section, class against class Much of the comparatively dull revision work which will always be necessary can be infused with new life if the element of competition is introduced The class can be divided into two sides, called Romans and Carthaginians, or by some other names The results produced by the two sections can be compared And permanent records can be kept Opponents may be allowed at times to ply one another with questions

Lastly a boy should be induced to emulate *himself* From time to time he should be led to compare his work of the present with that of the past, he should be praised for improvement, and incited to progress still more in the future

Where marks are systematically given, a summary can be prepared at regular intervals And each boy, under the supervision of the teacher, can construct a "curve" indicating his comparative progress or retardation Figure 11 (on the next page) is an actual example taken from the records of a French elementary school The totals were made each fortnight, the maximum being 30 A dot was placed in the square opposite the total obtained for the fortnight, and by joining all the dots the "curve" of progress or retardation was produced

(3) *The tendency to seek pleasure and to avoid pain* is the most general and far reaching of all innate tendencies By some it has been called an *instinct* [1] But it is such a

[1] *E g*, Thorndike, *Elements of Psychology* pp 309 10, and Sully, *The Teacher's Handbook of Psychology* (New Edition), p. 477

fundamental feature of all our activity that it should rather be regarded as a general law influencing all our mental life. As we have already indicated, it plays a most important

WHAT I HAVE BEEN WORTH UP TO THE PRESENT TIME.

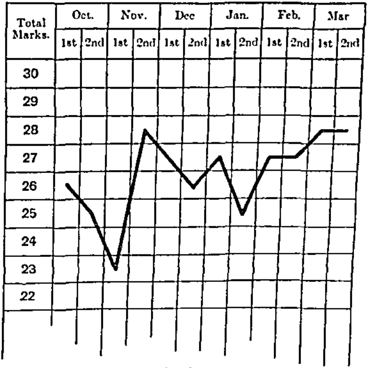

Fig. 11.

part in the modification and development of all our other instincts and innate tendencies, the particular kinds of habits which are formed being largely due to its influence;

it also plays a large part in developing many habits which are more or less independent of the instincts

For pleasure and pain initiate conation on their own account. Although we know nothing of the physical processes underlying them in the nervous system, we are certain of them as psychological facts and of their effects. Professor James puts the matter as follows: "If the mechanical activities in a cell, as they increase, give pleasure, they seem to increase all the more rapidly for that fact; if they give displeasure, the displeasure seems to damp the activities The psychic side of the phenomenon thus seems, somewhat like the applause or hissing at a spectacle, to be an encouraging or adverse *comment* on what the machinery brings forth."[1] Or, as Professor Stout says, "there is a constant tendency to persist in those movements and motor attitudes which yield satisfactory experiences, and to renew them when similar conditions recur; on the other hand, those movements and attitudes which yield unsatisfactory experiences tend to be discontinued at the time of their occurrence and to be suppressed on subsequent similar occasions. By the working of this Law of Subjective Selection, as it is called, relatively blind and undirected activities become gradually guided into definite tracts, each advance paving the way for further progress."[2]

The additional conation due to pleasure is called *appetition*; that conation which involves a ceasing or a turning away from activities which bring pain is called *aversion*. This latter often involves not merely a ceasing from the activities which bring pain, but a positive struggle to get out of a disagreeable situation.

It is important to note that there is often a remarkable

[1] James, *Principles of Psychology*, Vol II, p. 584

[2] Stout, *Groundwork of Psychology*, pp. 72 3.

reciprocal reaction between conation and feeling. As we have already seen (p. 43), conation which is allowed free play produces pleasure. And the pleasure produced heightens the conation. When, on the other hand, a given conation is obstructed, it produces pain; and pain tends to damp the activity. The obstruction may increase the tendency for the moment. But, if that obstruction cannot be removed, the pain is also increased, and ultimately damps the activity. Of course all feeling is not produced in these ways. Often pleasure or pain arises in the course of our activity quite independently of the tendency which is in operation. A young child may have a tendency to carry things to its mouth. A given thing may turn out to be "nice" or "nasty." In this case the pleasure or pain produced is not due to the furtherance or obstruction of the tendency, but to the nature of the experience produced by the tendency. But, in whatever way they are produced, pleasure and pain always arouse respectively *appetition* and *aversion*.

Another, and perhaps a more appropriate, name for the law in question is the *Law of Hedonic Selection*, the word *Hedonic* indicating what determines the selection of certain activities (viz. *pleasure* and its opposite). Now we are continually experiencing pleasure or pain. Consequently this law is always more or less in action. Our appreciation of its activity, however, can be most definite in those cases where intense pleasure or pain occur and determine very marked changes in our activity. Thus the baby stretches out his hand to the candle flame and gets burnt. The pain determines a quick aversive movement, and probably stamps out for ever the tendency to touch flames. We call this *learning by experience*. At another time the baby may put his thumb into his mouth and suck it. This gives him pleasure, and he continues. Thus a *habit* is formed.

But it is a *bad* habit. And his mother consequently endeavours to stamp it out. She may, for instance, put mustard on his thumb When now he puts his thumb in his mouth, he experiences pain. This checks the movements, and may thus destroy the habit.

Now the punishments and rewards which we sometimes administer to children depend largely for their efficacy on the same law. And it might appear at first sight that we can get just the habits we require by a systematic use of them. But further examination will show that their efficacy is comparatively limited

With the baby, who approximates to a lower animal, we can indeed pursue a fairly mechanical system of rewards and punishments. We can arrange, for instance, that his tendency to suck his thumb is damped by the pain which occurs when mustard is placed upon it. He does not yet distinguish the fact that it is only the mustard which prevents him from getting the usual pleasure The experience is a *whole* in which he does not discriminate the parts. This whole is painful, and he gives it up

But if the habit has remained fixed till a later stage, our problem is much more difficult For the child now sees clearly that the pain produced is not the result of sucking his thumb, *but of the mustard which is placed upon it.* We may continue to check him by insisting on mustard being kept on his thumb But we may be merely preventing him from indulging a tendency *which is increasing by the obstruction* If the child could get a few moments with his thumb clear of mustard, he might seize the opportunity to suck at it more greedily than ever. We have innumerable instances of young people who have been repressed by harsh discipline during their school life, and who break out into evil courses when they are freed from control.

Questions on Chapter VI

1 Some conations are largely instinctive or innate, some are *largely due to the influence of pleasure or pain* *Give examples of* each and examine them

2 Punishment often tends to reform the offender. Indicate how it produces its effect

3 Why is it justifiable to use small punishments and rewards freely with very young children, though we use them sparingly later on?

4 Explain what is meant by the "sympathy of numbers," and indicate what use the teacher should make of it

5 Define *suggestion* as a mode of producing belief. In what subjects can it be employed, and in which should it be avoided?

6 Show how the emulation of the boys can be excited and made of service in (*a*) arithmetic and (*b*) physical exercises

CHAPTER VII.

THE DEVELOPMENT OF INSTINCT AND HABIT.

In the early stages of human life, the various instincts and innate tendencies show themselves in more or less separate and simple forms. But with the progress in intelligence, ideas increase in number and complexity and bring with them a corresponding complexity in the emotional life. One single object may evoke more than one instinct at the same time. Thus, at the sight of a snake or a toad, the child may show *loathing*, which seems to be a combination of *fear* and *disgust*; at the sight of a tall man riding a great horse, he may show *admiration*, which is probably a combination of *wonder* and *subjection*; at the sight of a troop of soldiers dashing along on horseback, he may show *awe*, which is *admiration* blended with *fear*. In this way the instincts give rise to a large variety of complex emotional attitudes and tendencies.

But, as experience continues, certain objects are continually recurring, being viewed from many sides and under varying circumstances. These objects become the centres of systems or masses of ideas, which are continually being added to and modified by further experience of the objects in question. In other words *apperception* is repeatedly taking place, our knowledge thus increasing in range and complexity. With this development on the cognitive side there is a corresponding increase in com-

plexity and range on the emotional and conative side We not only experience complex combinations of emotions, but we have different emotions in connection with the same object at different times according to changing circum stances Further, since the object is again and again presented in similar circumstances of each kind the various emotions and combinations of emotions are continually being re excited in connection with the object and the ideas related to it In this way firm associations are formed between the object and its system of ideas on the one hand and a large number of emotions and tendencies on the other Considerable modifications continue to take place with changing circumstances, but, on the whole, definite tendencies to act and feel in certain ways become fixed *Habits* of feeling and acting are thus established, and the whole system of ideas, feelings, tendencies and habits may be called a *sentiment*

The "object' may be of any kind In the more simple cases it is a concrete person or thing But with further development classes of things may also become the centres of sentiments And, finally, abstract things like justice and virtue may become the nuclei of these emotional and conative dispositions

Let us now take a simple example Suppose that a child is placed under a violent tempered teacher, who is unsympathetic and indifferent to the child and who is constantly threatening scolding, and perhaps beating him At first the child is thrown into a more or less simple state of fear at each violent act or speech of the teacher But repetition soon creates a *habit* of fear, so that whenever the child sees the teacher, or even thinks of him he becomes timorous, although there may be no *present* reason for fear

A simple sentiment such as this will readily become more complex both on its ideational and on its emotional

and conative sides. Thus, as the child's knowledge of the teacher develops, his anger may be frequently evoked by what he is now able to judge as harsh punishments and restrictions. Disgust and the spirit of revenge may soon follow. These various dispositions to feel and act become more and more intimately connected with the object, which tends to excite them, sometimes several in combination, sometimes in turn, whenever it is presented, whether in reality or in idea. The rudimentary sentiment of fear has developed into a full-blown sentiment of *hatred* of the teacher.

It is obvious that similar sentiments may grow up about the ideas of other individuals or institutions. Thus some children develop an intense hatred of school, or of some particular branch of school activity. Sometimes this sentiment originates with the teacher, in the way already described, and spreads over to the subjects and to the institution in general; sometimes its origin is rather the way in which the subjects are taught, and the general organisation of the school, which is badly adapted to the child's nature.

Let us now take an example of a different kind. An act of kindness by the teacher to the child may arouse *gratitude*. This seems to be a combination of tender emotion and subjection. It is merely a complex emotion, and may occur only once. But if the teacher repeats his kindly acts, the gratitude of the child may become more or less habitual, constituting an emotional disposition always ready to be excited by the presence, or by the idea of, the teacher. Further, other instinctive tendencies may be aroused in connection with the object. The [illegible]'s gratitude may lead him to bring the teacher [illegible] offer him some service. He may take p[illegible] these things, on account of his instinct o[illegible]ing

possible into the child's mind, but, while giving some knowledge, *to create an appetite for more.* The school should prepare the children for making a good use of their leisure as well as for beginning to learn some trade or profession. And in doing this the school is not really unpractical. For those who employ their leisure profitably will be all the better as workmen.

This building up of a "many-sided interest" depends largely on the way in which the teacher sets about his work. It can only be done successfully if he takes account of the instinctive tendencies and emotions which the children possess on coming to school, if he appeals to these in the first place, gradually refining and organising them by the matter which he selects, by his methods of presenting it, and, above all, by his own enthusiasm for it, which will, to a large extent, communicate itself by sympathy to the children. A teacher, for instance, who is not a lover of literature himself will scarcely develop much of the literary sentiment in his pupils.

The teacher must not expect the higher forms of interest before the lower forms have had their day. He must remember that the young child is largely a creature of sporadic emotions and tendencies. But the same primitive tendencies which determine keen attention to such crude tales as "The Three Bears," "Jack the Giant-killer," and "Cinderella" will, if carefully nurtured, refined, and organised, bear fruit finally in sentiments which will bring with them keen appreciation of "Hamlet," "The Merchant of Venice," and "The Mill on the Floss." The same tendencies which induce the child to work hard at his clay-modelling, his paper-cutting, and his drawing will, with proper development, give rise to interest in machine-drawing, in scientific experiment, and in architectural planning and design.

All that has just been elaborated may be summed up by the statement that *interest determines attention* Attention is the direction of cognitive activity to one object rather than to another And this direction depends largely on the conative forces which are at work When these conative forces have been organised into a complex system of tendencies and habits, the interest may be called a *sentiment* And that is usually the case when the child has made some steps forward in a subject

Observe, however, that the new matter presented must be within the intellectual grasp of the pupil Looked at from the *cognitive* side an interest in a subject includes a system of ideas which has been developed, and the new matter presented must be capable of comprehension in the light of what is already known Suppose that a teacher develops an interest in geography by a carefully graded and suitable series of lessons up to a certain point Suppose, then, that he begins to give further lessons which cannot be grasped on the basis of the knowledge which has already been acquired The boys may begin to attend to such lessons with great keenness, due to the interest they already have But the intellectual conditions of apperception not being present, no progress can be made The boys will not only be unable to go on attending, but their failure will go far to kill their interest The checking of any activity is painful, and pain, as we have seen, gives rise to aversion

To get continued attention to any lesson, therefore, we must fulfil two great requirements (1) what we present must be capable of being apperceived or understood by the pupils, and (2) it must be interesting to them, i e it must appeal to their emotions and tendencies, innate or acquired. We have just seen that the second condition is insufficient without the first. But the first is just as incapable of

securing attention without the second. Many people can understand easily enough what a prosy lecturer is repeating but they are not *interested*, and they consequently fail to attend. "It is true that to find a book interesting we must have sufficient knowledge to understand it; but it is not true that we find interesting everything we have sufficient knowledge to understand."[1] As well as being *able* to understand we must be *anxious* or *desirous* to do so.

But, it may be pointed out, we often find people attending to things which are not interesting. "What more deadly uninteresting object can there be than a railroad time-table?" asks Professor James.[2] Yet people are found attending to it every day. Are, then, the principles we have laid down invalid? By no means. Attention in such cases is still determined by interest, though that interest is not in the object as such. But attention to the object in question is a necessary step in the course of a more comprehensive activity which *is* interesting. We have no interest in a railroad time-table as such, and we should never attend to it for its own sake. But if it is necessary to know the time of a train in order to proceed on a journey, we consult the otherwise uninteresting time-table with eagerness. We can either say that the time-table *is* still uninteresting in itself, but is attended to for the sake of our interesting journey, or we can say that the time-table *becomes* interesting because of its connection with our journey. It matters little which form of language we use, so long as we are quite clear as to our meaning. Professor James prefers the latter; for he goes on to say: "Yet where will you find a more interesting object if you are going on a journey, and by its means can find your train?"[3]

[1] Welton, *The Psychology of Education*, p. 240.
[2] *Talks to Teachers*, p. 95.
[3] *Ibid.*

And he frames the general statement as follows *Any object not interesting in itself may become interesting through becoming associated with an object in which an interest already exists The two associated objects grow, as it were, together the interesting portion sheds its quality over the whole, and thus things not interesting in their own right borrow an interest which becomes as real and as strong as that of any natively interesting thing*"[1]

Such interest is often called *derived interest*, and the attention which it involves is sometimes spoken of as *voluntary attention*[2] Now there are various degrees of "derivation" In the case already cited, the object in which a derived interest is taken is most intimately connected with the interest or purpose which controls the whole business in hand. Further, attention to that object is only necessary for a few moments It is, then, a very small episode in the career of the parent interest Consequently it is not noticed as a necessary evil, it is swallowed up, as it were, in the interesting business of making a journey But often the object to which attention must be paid if our interest is to work itself out is of greater complexity and demands a large amount of dis

[1] *Op cit*, p 94.

[2] The attention determined by a thing which is interesting in itself is often called *involuntary* But the term is rather unfortunate Some prefer *nonvoluntary*, reserving *involuntary* for the reflex attention compelled by irresistible stimuli (like loud noises)

The terms *voluntary* and *involuntary* have already been used earlier in this book (see p 20) in dealing with *actions* of various complexities But attention *is* activity It *is* the fundamental activity whether we are ' merely " thinking or whether we are making some concrete movement. In the former case, we attend to the ideas which arise. In the latter case, we cannot do the thing unless we are attending to the percepts which arise If somebody draws off my attention while I am engaged in catching a ball, I may drop it.

tasteful activity. In such cases, it is not swallowed up by the interesting whole of which it forms a distasteful part. And there may be a real struggle between aversion from the distasteful business and the desire to proceed with our business. But even here the interest in going through with the matter may be strong enough to win the day. The following is a case quoted from Professor Ribot :—

"A child refuses to read; he is incapable of keeping his mind fixed on the letters, which have no attraction for him; but he looks with avidity upon the pictures contained in the book. 'What do they mean?' he asks. The father replies: 'When you can read, the book will tell you.' After several colloquies like this the child resigns himself and falls to work, first slackly, then the habit grows, and finally he shows an ardour which has to be restrained. This is a case of the genesis of voluntary attention. An artificial and indirect desire has to be grafted on a natural and direct one. Reading has no immediate attractiveness, but it has a borrowed one, and that is enough. The child is caught in the wheelwork, the first step is made." [1]

This is perhaps an optimistic account. It presupposes a very strong parent interest, one which will hold on its course continuously through much uncongenial material—a rare thing with young children. It represents, however, the kind of thing which the teacher should attempt. He should, of course, begin by inducing voluntary attention to objects which are closely connected with some of the primitive interests of the children and which do not involve very much effort or a very long period of concentration. Gradually, however, he can lead the children to take longer excursions through fields which are not attractive in themselves. Here, however, he will sometimes find that

[1] Ribot, *The Psychology of Attention*, English Trans., p. 38.

attention slackens, either because the parent interest is not strong enough, or because the unattractive field is too broad or barren or because some other attraction is soliciting the attention of the child

The teacher is often himself to blame for such unfortunate occurrences He may have failed to appreciate the forces for and against him But sometimes, though he is clearly aware of these forces, he deems it necessary to require the children to make the effort in question They will have to make such efforts in later life, and they must be gradually accustomed to them as they grow up *Habits* of attention have to be acquired In such cases, the teacher must arouse some other forces or conations in order to secure the victory For as we have already noted, *some* interest or tendency is always necessary The difference between the various educationists is largely a difference as to *what* interest or tendency Where the tendency or interest, with which the intrinsically uninteresting object is most intimately connected, lacks the requisite force, more external interests or motives have sometimes to be aroused Reward and punishment, praise and blame, have their place here, *especially in the early stages of the child's life*

If, however, reward and punishment, praise and blame, are largely relied on throughout the child's whole education, his efforts and attention will come to depend on these But when he goes out into the world, the regularity of these stimuli will diminish The *habits* of making efforts may persist to some extent But the loss of the motive power will soon be felt The great object of the educator, however, is so to bring up the child that when the time comes for him to be given his freedom, he may behave well on his own initiative How necessary, therefore, it is to accustom the child gradually to think and act inde

not gradually transformed from a more or less complete absorption in self to a comprehensive and well-balanced consideration of self *and one's obligations to others*, the conduct of the future will not be of a highly moral kind.

True self-respect, which is to be the ruling sentiment, must include respect of others. It therefore involves not merely self-assertion, but a due amount of self-abasement. "The main condition of the incorporation of this disposition in the self-regarding sentiment is the exercise of authority over the child by his elders. At first this authority necessarily demonstrates its superior power by means of physical force, later by means of rewards and punishments. On each occasion that the exercise of personal authority over the child makes him aware of a superior and inflexible power to which he must submit, his negative self-feeling is evoked; then his idea of self in relation to that person becomes habitually accompanied and suffused by this emotion in however slight a degree, and he habitually assumes towards that person the attitude of submission. Thus the disposition of this emotion becomes incorporated in the self-regarding sentiment."[1]

Children, of course, differ very much with respect to the relative strength of their instincts. Some possess such a nicely balanced system of instincts, the altruistic tendencies being in due proportion to the egoistic, that their behaviour works out largely in harmony with the needs of society. With the majority, however, this is not the case, and special educational treatment is necessary. This treatment often has to include rewards and punishments. But these means should never be abused. As the child grows more sensitive, praise and blame can be used with marked effect. Many teachers neglect these milder means.

[1] McDougall, *op. cit.*, p. 194.

Praise especially, however, can be made a most potent instrument of progress, particularly in cases where the teacher is highly respected by the children

Another means of developing a higher form of self-regarding sentiment is by definite instruction *Moral instruction* has often been condemned on the ground that it appeals only to cognition It is pointed out that many men know what they ought to do, but fail to act accordingly But we have repeatedly insisted that instruction should not be divorced from behaviour It is quite true that mere knowledge of one s duty is of little value without the right tendencies and habits But if such tendencies have already been developed, by religious teaching and by the other means referred to, further instruction with respect to duty will both strengthen and guide them The ideas aroused, whether by story or precept, are of little value considered solely on their intellectual side They must arouse emotions and impulses to action But if these have already been partially developed in the ways already mentioned, moral instruction may bear considerable fruit In this field, as well as in all other fields of knowledge, we cannot arrange for the child to find out everything for himself in the course of his individual experience We enlarge his views of himself and of his relations to the world by telling him more than he could ever discover if confined to the limits of his own life

It is this intimate connection between knowledge and tendencies which gives rise to what are called *ideals, purposes, aspirations*, and *ambitions* In the early stages of human life, and throughout the whole of the lives of the lower animals, conations arise and run their course with little thought accompanying them But in the case of the human being the sporadic conations of early life are gradually modified and directed to definite *ends*, which

aspirations can be evoked to support it (thus taking the place of the system of rewards and punishments which is sometimes necessary in the early stages) This highest type of self determined effort is usually known as *volition* And the attention which is paid to the intrinsically unattractive material can be called *volitional attention*

This is the highest form of voluntary attention But like all other forms of attention, it still involves interest The interest in this case, however, is partially derived from another factor In the lower types of voluntary attention already described, attention to an unattractive object is determined by interest in something with which that object is more or less closely connected In the volitional type, the parent interest in question is not strong enough by itself to overcome the aversion from the unattractive object, and has to be supplemented by interest derived from a still higher source—the self regarding sentiment or, to use more ordinary language the determination to do our duty at all costs It is such acts as these whether they nvolve chiefly the direction of attention or the performing ome concrete act, which may be called *self control* Our aspirations are called in to control the lower pro when these are in danger of gaining the victory

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Vol II, p 549

the individual foresees, *i.e.* of which he has ideas. There gradually grows up a more or less clear understanding of the whole business of life. We not only push forward, but we know whither we are tending. In other words, we acquire ideals, purposes, or aspirations. Looked at from the conative side, these are tendencies or impulses accompanied by emotion. Looked at from the cognitive side, they are merely ideas of the ends towards which we are tending. But in practice they are not to be separated into these aspects. And if this is so, we can improve them not only by cultivating the emotions, tendencies, and habits which constitute their motive power, but also by developing their intellectual side through what is called moral instruction.

This moral instruction can take various forms. In some schools definite lessons are devoted to it. With the younger children these lessons would take the form of short stories vividly told, without over-insistence on the moral implied. But in all schools, whether special lessons are assigned to moral instruction or not, the ideals embodied in religion, in literature, in the fine arts, in government and other human institutions should be brought home to the boys, so that their minds are opened to the greater sphere, of which their own personal environment is only a part or aspect.

In this way the self-regarding sentiment comes to incorporate within itself a rich system of ideals or purposes which are harmoniously systematised, so that behaviour gradually changes from being a mere succession of isolated responses to this or that stimulus to an interconnected series of acts forming an orderly sequence.

And when one partial purpose or interest is on the point of being overcome by aversion from the unpleasantness of the task which arises in its course, the whole system of

aspirations can be evoked to support it (thus taking the place of the system of rewards and punishments which is sometimes necessary in the early stages) This highest type of self determined effort is usually known as *volition* And the attention which is paid to the intrinsically unattractive material can be called *volitional attention*

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"The facts may be most briefly symbolised thus P standing for the propensity, I for the ideal impulse, and E for the effort

$$I \textit{ per se} < P$$
$$I + E > P\text{"}[1]$$

The effort (E) is derived from impulses connected with an enlightened self regarding sentiment or, as it is more often called in ordinary speech, a sense of duty

[1] James, *Principles of Psychology*, Vol II, p. 549

It is obvious that *habit* is a most important factor here. If the child can be frequently led to revive thoughts of himself and of his nobler aspirations at times of temptation, he will acquire a habit of self-control. Such a habit will tide him over many difficulties in which he would cut a sorry figure if left to the mercy of momentary inclinations. Further, the work of volition will become easier. For the moral life is not necessarily a series of severe conflicts. Habit not only strengthens the sentiment of duty, but it fixes the general line of procedure. It cannot, of course, provide for all the varieties of conduct which are necessary in a complex society. We can never hope to live the highest type of life by mere habit. But it can render the self-regarding sentiment so strong and certain in its action that there are few if any conflicts.

"In this way the self comes to rule supreme over conduct, the individual is raised above moral conflict; he attains character in the fullest sense, and a completely generalised will, and exhibits to the world that finest flower of moral growth, serenity. His struggles are no longer moral conflicts, but are intellectual efforts to discover what is most worth doing, what is most right for him to do."[1]

Character, then, is the source of our conduct. It is the sum of all the tendencies which an individual possesses. It is based, therefore, in the first place, upon the instincts and innate tendencies which the individual possesses on coming into the world, or which develop as time progresses. But these become modified by the physical and social environment of the individual, giving rise to more or less fixed dispositions to act in certain ways in relation to certain objects. Character has, therefore, been often called a bundle of habits.

[1] McDougall, *op. cit.*, pp. 262-3.

But it is more than this For habits are mechanical reactions to certain definite situations, whereas human life is never a series of repetitions of exactly the same situations. There must, therefore, be a power behind the habits which secures modifications of conduct as different circumstances arise "A youth may have formed an excellent set of home and school habits, but if these are all his moral stock-in-trade, he may fail miserably when he enters upon the freer life of college or of the world of business. Life is at all points too complex an affair to be worked by machinery. . . ."[1]

Character, then, retains much of the instinctive and emotional basis which is the starting-point of the habits, which helps to sustain them, and which is itself reinforced and more firmly established by them It includes the organisation of these tendencies, with their emotions, into sentiments; above all, the organisation of that great ruling sentiment which we have called the self-regarding sentiment, but which, when truly moralised, is usually known as devotion to duty.

And since, under such conditions as we have described, the tendencies are towards right conduct, pleasure is found therein—that pleasure which is due to the harmonious working of a system of impulses which all obtain their due amount of satisfaction. As Aristotle says, "A man is not good at all unless he takes pleasure in noble deeds No one would call a man just who did not take pleasure in doing justice, nor generous who took no pleasure in generosity, and so on."[2] In other words, the moral life is one of true *happiness*. And in educating children towards it, we are making them not merely more useful

[1] Raymont, *The Principles of Education*, pp. 328 9.
[2] *Ethics*, I. viii. 12.

boys instanced in the last examples might be overcome by the extremely curious nature of the operations they are watching But a third boy might reflect "Father will be so sorry when he hears I have been late" And if he is very susceptible to the praise and blame of his father, he may make a great effort and be off

4 Another boy might be a member of a class in which a strong corporate spirit exists and which hopes to distinguish itself as the most punctual in the school The idea of its loss of prestige of the disgust of his comrades at his failure to keep up the reputation of the class may arise in his mind and overcome all other considerations This is quite a high type of volition for a young boy

5 But with the highest type of boy, there may arise cases in which he is not directly dependent on some definite approval or disapproval. He begins to be the spectator in the gallery to himself He says to himself I ought to be ashamed of myself idling here when my duty is to get to school This higher form of self consciousness is rare But it is to be found

When such a stage as this last has been reached the child is already beginning the higher life If he has access to good literature and more important still if he grows up among people of high moral purpose he may finally rise to such strength of character that he becomes a permanent law unto himself and is able to decide for the right amid temptations of the severest kind

Now in the task of forming character the educator is not always thinking of the complex whole which he is endeavouring to shape He has frequently to deal with the individual tendencies and habits which go to make that whole In particular, he has often to face the task of repressing evil tendencies and habits Punishment is

the most ready instrument. But all other means should be tried before recourse is had to this drastic and dangerous remedy. Let us, then, briefly consider some of these other means.

In the first place, a tendency or habit is likely to die out on account of lack of exercise. If we can avoid the circumstances which excite it, we are giving it a chance to disappear. This may be called the method of *disuse*. Thus a boy may be given to envy. If we can prevent him from being overshadowed and supplanted by others, we are giving him an opportunity to rid himself of this bad quality. We are pursuing the same method when we prevent copying by such careful arrangements that there is no temptation to it. So with lying, laziness, and many other bad tendencies. A good organisation of the work so that each boy finds plenty to do, and does it, will close up many loopholes which would otherwise allow evil tendencies to creep in.

But the converse of the principle just stated is also true. An instinct which is frequently exercised becomes firmly grounded in habit. And this fact will be of great use in developing the good tendencies. But it has a still wider application. For, while we have a large number of instincts, we have only a certain amount of conative energy. If this is continually being drawn off into certain channels, it cannot take other courses. Hence the development of good tendencies tends to suppress the bad. This may be called the method of *substitution*. The more, therefore, we can fill the minds of the boys with healthy interests, the less chance is there for the evil to prosper.

A special case of this last method is that in which one tendency is more or less incompatible with another. For instance, envy could be opposed by *esprit de corps*. A boy could be so consumed with the desire to see the reputation

of his school augmented that he would be delighted with the achievements of his comrades, even though they threw his own into the shade

Our duty, then, is to watch for budding instincts of a promising kind, to foster them, and to lead them into channels in which they will develop into useful habits To the teacher who is inclined to view the innate tendencies which he finds in the child with absolute despair, it may be pointed out that no instinct can be considered absolutely bad in itself One and the same instinct, according to the field in which it is employed may be the germ of good or of bad habits We have already seen in the last chapter how the instinct of acquisition may lead on the one hand to useful habits of collecting and of thrift, and on the other, to bad habits of stealing and other forms of unjust dealing As another example, let us take the tendency to bully, found in some boys of striking personality and strong physique This tendency is compounded largely of self assertion and pugnacity But from giving rise to bad habits it can sometimes be turned into useful channels Thus the boy may be made a monitor with some right to control his fellows and some duties towards them The tendencies in question will thus become transformed into habits which are beneficent both to their possessor and to the community in which he is placed. This may be called the method of *diversion*

We have already noted the importance of *imitation* as a factor in the production of conduct.[1] If the teacher is highly respected, his *example* will have a powerful influence But the example of the other boys is also a powerful factor Hence the need of a 'good tone' in the class *Precepts* also—whether embodied in systematic moral

[1] See pp. 92 ff.

instruction or enunciated at opportune moments from time to time—may be of some efficacy. For we have seen that *suggestion* is a powerful force with young children. But we must remember that there is danger of *contra-suggestion* if much *direct* preaching be done, especially in the case of older children and with a teacher of weak personality.

It is necessary here to point out that no given method is infallible. The inordinate strength of an evil tendency, the impossibility of controlling all the circumstances, and many other conditions, render it hazardous to predict success in any particular case. And we sometimes have to fall back on *punishment*.

Punishment, then, is often a necessary evil. Sometimes there are plenty of good tendencies, but they are overwhelmed by some evil tendency which cannot be removed by any other method than brutal extinction. Take the following example.

"Frank, when he was six, had for a while been away from home, and on his return suffered severely from 'swollen head.' There was no managing him in the nursery. For a fortnight life with him was endured by the nurse and the other children; it is difficult to find a word strong enough to describe the pitch of his lawlessness and even rudeness. . . . Frank was properly whipped. The whole atmosphere of the house was different afterwards; it was as if the child had before been possessed by a devil, now angels came and dwelt in him! At home it was the last whipping he needed for more than a year.

"Punishment had produced an effect which, from the outside, looked like moral conversion. Moral conversion it cannot be. Pain cannot turn the child from an enjoyment of wrong-doing to a love of right. What had happened was that the better instincts of his nature—better

instincts which were undoubtedly there—did not show themselves in action because other and bad instincts blocked their path'[1]

In some cases the "discipline of consequences" may be resorted to In other words, the child may sometimes be punished by allowing him to suffer the obvious results of his actions Thus a child who fails to get ready for a walk may be left at home, or a boy who has broken some thing may be required to pay for it This kind of punishment often saves friction, the child recognising its justice But it cannot always be used In some cases the punishment would be too great in others too small. One boy who neglects to put on his overcoat contracts pneumonia and dies, another does not even catch cold We cannot leave all to nature Authority must often step in with its more artificial punishments

Lest any teacher however, should construe this advocacy of punishment into a general permit for indiscriminate resort to it let us hasten to add that neglect of the child's more specialised tendencies is an irreparable error Out of the child's instincts it is possible to develop a number of sentiments which will become the stimulating and directing forces of behaviour on comparatively high planes But if we continue to resort to punishment and reward throughout the child's school career, we shall make the Law of Hedonic Selection the ruling principle of his life Many of his other instincts will die out for lack of exercise

Darwin late in his career, regretted that he had lost all interest in literature He found it impossible to revive any desire for the reading of works of imagination His inordinate pursuit of science had prevented the growth of his literary sentiment This may not be considered as greatly to be regretted in the case of Darwin For his dominant

[1] Mumford, *The Dawn of Character*, pp 114-115.

interest was a highly useful one. But with the more ordinary human beings, there is no such lofty interest. If we fail, during their school life, to make something of the comparatively feeble tendencies which they possess for higher things, we turn them out with no ennobling interests, but with the general tendency to seek pleasure and avoid pain and some lower instincts as their chief motives.

As already indicated, however, none of our recommendations can be adopted blindly, as if they indicated absolutely certain means of developing good character. To the teacher remains the difficult task of studying each individual case, with all its complications, and of deciding upon the course of treatment which he considers most likely to prove successful.

Questions on Chapter VII.

1. State fully what is meant by the term *sentiment*. What other terms mean very much the same?

2. Bring out the importance of *habit* as a factor in producing moral conduct. Point out its limitations.

3. How can moral *instruction* improve the character of a child? Point out its limitations.

4. Mention some of the ways in which it is possible to rid a child of many of his bad tendencies without relying chiefly on punishment.

5. Describe a case of *volition* as it might occur in a young child.

6. What is *interest*, and how is it related to *attention*?

7. Explain and illustrate the statement, "Right methods produce interest."

8. Why should the elementary school devote a large amount of its time to instructing the children in "culture" subjects, the direct utility of which in earning a living is small?

CHAPTER VIII

A GENERAL SKETCH OF THE STAGES OF CHILD DEVELOPMENT

"Why is it that what children want seems silly to grown ups, and what grown ups want seems silly to children?" Such was the question asked by a girl of ten The answer to it is that children are swayed by comparatively crude and simple innate tendencies, whereas in adults these tendencies have been modified and organised into a complex system of sentiments which involve richer intelligence and which give rise to wants of very different kinds

The teacher, however, must not regard the cruder impulses and desires of children as "silly" He must rather recognise in them natural forces which by modification and development will become the springs of the higher forms of behaviour And he must recognise, further, that the process of modification and development goes on gradually, so that what appeals to a child at one age will not appeal to him at a later stage

An exact knowledge, therefore, of the stage of development—with respect to both intelligence and tendencies—which the child reaches at each age of its career is of supreme importance Much casual information, gained by more or less unscientific child study, has been collected by

various industrious individuals. But reliable scientific data are now beginning to be recorded, though a great deal still remains to be done in this field.

Since the body is closely related to the mind, it is important to know something of the way in which the human organism develops.

Growth both in height and weight does not take place uniformly. There are spurts and arrests. Arrests occur at about 6, 11, and 18 in the case of boys, a little earlier in the case of girls. The greatest spurt is at puberty. Since girls usually undergo this change earlier than boys (*i.e.* at about 12), they gain rapidly on the boys for a time. Although at most ages they are lighter and shorter than the boys, they usually show distinct superiority in both respects at the ages of 14 and 15.

Now whether there is a very close correspondence between mental growth and bodily growth is at present uncertain. There seems, at any rate, to be a general correspondence. It is certain, for instance, that there is an arrest in mental development about the age of 11, and further that there is rapid mental development at the time of puberty. The teacher should, therefore, abstain from making great exactions at the former age, but he can look for marked advances when he knows that puberty has arrived.[1]

Observations on the continent seem to indicate that the first marked arrest in physical growth is due to the great change which going to school involves. We have noted that the arrest occurs at about 6, and this is usually the age at which children are obliged to begin school on the continent. (With us, of course, it is 5.) It is probable that the sudden change from the comparative freedom of

[1] The fact that puberty arrives at different ages with boys and girls respectively is an obstacle to the co education of the sexes in upper schools.

home life to the more restricted life, with respect both to thought and movement, which even the most modern schools involve makes too great a demand on the child, so that he suffers both mentally and physically. The rate of mortality has been found to increase during the first school year.

It is possible that these serious consequences can be to a large extent avoided by the improvement of school conditions For where the school conditions are most unfavourable retardation is greatest. School conditions can be improved both on the hygienic and on the pedagogical side

With respect to hygienic conditions, the amount of space per child, the efficiency of ventilation, the regulation of heat, and the provision for frequent movement from place to place are most important. These matters, of course, are also important in the home, in which the child spends even more time than in school Careful measurements of children in Glasgow showed that on the average boys from one roomed homes were 11·7 lb lighter and 4 7 inches shorter than boys from four-roomed homes, while girls from one-roomed homes were 14 lb lighter and 5 3 inches shorter than girls from four-roomed homes. The teacher can do little to improve the hygienic conditions of the homes of his scholars But the alarming results of poor conditions in the home should impress him with the necessity of making the school life as healthy as possible.

With regard to the pedagogical conditions of the school, the most general statement to be made is that they should be much less rigid than is usually the case. A great deal has already been done in our infant schools in this respect. The influence of Froebel, who emphasised the need of allowing spontaneous self-activity on the part of children, has done much to revolutionise the

the school life of young English children. But more remains to be done. And Madame Montessori, a great Italian educationist, has developed a system of education for younger children which we should do well to imitate in many respects.

To quote from a recent account of her schools, "Dotoressa Montessori has always protested against the assumption that good order and immobility are interchangeable terms. She is no advocate of lax discipline; but she holds that ✓we must revise our conception of discipline, especially when we are dealing with young children, for whom bodily exercise and freedom of movement are among the first conditions of healthy and happy life. A repressive system of education, which compels children to do what they do not want to do, and holds in check their healthy and natural activities, has made repressive discipline a necessity if any semblance of progress is to be made. The function of discipline, in a school of conventional type, is to shut down and sit upon the safety-valve of 'naughtiness,' a safety-valve which the children's spontaneous energies, when wantonly repressed, instinctively try to use. In a school in which the energies of the children are constantly and happily employed, that safety-valve has never to be used, and the need of repressive discipline ceases to be felt. In a Montessori school each child is given the maximum of freedom that is compatible with his not hurting or incommoding others; and so long as he is busily and suitably employed he is not likely to hurt or incommode others, or to make himself a nuisance to the school as a whole."[1]

Weakly children suffer more retardation on entrance into school than strong ones. The teacher, however, with

[1] *The Montessori System of Education*, Board of Education, p. 19.

his thoughts bent on producing "results" is often inclined to concentrate his efforts upon these pupils His desire also to secure a good percentage of attendance makes him view with disfavour and irritation any attempt on the part of the parents to coddle the child by allowing him to stay at home when he does not feel anxious to go to school But the parent's point of view is often the right one, though frequently it is not until the doctor reinforces it by his authority that the teacher is disposed to give way If we are to smooth the transition from home to school, we must be prepared to exercise great elasticity in our requirements during the early stages and especially with weakly children

Mr Winch has demonstrated, after careful investigation, that early entrance to school is not advantageous to intellectual progress When children were tested at the age of 7-8, it was found that those who had been at school since the age of 3 produced results which were no better than those of the children who did not commence school before 5 Early entrance to school, then, is of no advantage *even with respect to progress in the school subjects* With respect to *general* intellectual progress, it is probably harmful For it tends, as we have seen, to produce retardation in bodily growth, and, although the correspondence between physical excellence and intellectual ability cannot be demonstrated at all points and in every individual case, it has been found that on the average this correspondence is very marked. The brighter children as a whole are bigger than the duller ones In early education, therefore, whatever else we do, we should make certain that the child leads a life of healthy bodily activity

Coming now to the intellectual nature of the
may state at the outset that the normal child

some degree all the powers which the adult enjoys. To take the highest of all the intellectual powers, it has sometimes been stated that reasoning does not occur till comparatively late in childhood. But the intelligent use of such words as *because* and *why* by young children is clear indication that they realise that interconnectedness of ideas whereby steps are made from one concrete fact to another. A little boy of two-and-a-half was playing at being a baker. His father, not knowing this, entered the room, and asked him for a kiss. "I'm a baker," he replied. His father persisted, asking him: "Well! why won't you give me a kiss?" He answered quite clearly, "Because bakers don't give kisses." His ideational system concerned with bakers represented these men as too dignified for such homely lapses as kissing.

In the field of perception, it is found that the child cannot distinguish such small differences as the adult. With respect to colour, tone and weight, for instance, differences which are easily recognised by adults are totally ignored by children. It has been calculated that for a difference to be just noticeable to a child of six, it must be three times that which could just be recognised by a child of twelve. As an example of results obtained in pitch discrimination we may note the following:—

Age	6	7	8	9	10	11	12
Least perceptible difference in 32nds of a tone	12·3	9·1	6·8	4·8	6·2	4·8	4·1.[1]

After the age of 12 there is little if any progress in ordinary perceptions unless special training occurs (as, for instance, with the tea-taster).

[1] Gilbert, J. A., "Experiments on the Musical Sensitiveness of School Children." *Studies from the Yale Psychological Laboratory*, Vol. I. (1892-3), pp. 80-87.

It is uncertain whether this perceptual imperfection of children is due chiefly to lack of development in the organs of sense or whether it is the higher cortical processes which are at fault. It is, however, clear that much perceptual activity is necessary in order to exercise the parts concerned and thus to promote their full development. This is secured by the early observation lessons. ✓

A further marked difference between the perception of the young child and that of the adult is that the former is usually unable to perceive several things together. The child tends to fixate one thing and to ignore the others. Thus when children of six were asked to compare the distances between points, it was often found impossible to get them to do it, because their attention remained fixed now on one point now on another. The same thing is noticed in the observation of pictures. Young children notice one object after another, but often fail to put all the objects together to form a complex whole. And when they are allowed, as they should be, to draw anything they like, they often put in very carefully certain things to which they have given attention, and leave out or only roughly indicate many others which adults would consider of greater importance. Often, too, there is no idea of proportion between the parts. Thus a house is drawn with a great keyhole as its prominent feature. Or a lady with a row of very large buttons as her chief characteristic.

In dealing with perception in the early chapters we noticed that it is never a mere reception of sensations. There is always a subjective reaction. On account of associations formed in the past, revivals of traces of past experience occur, and change the mere sensing into the cognition of some object. Sometimes these traces introduce error into our perceptions. Unsuitable traces are revived and overwhelm the actual sensations, making us think we

perceive an object which is *not* the one before us. This is often called an *illusion*. Children are more subject to this error than adults. Their discrimination of the actual sensations is so poor that these are more likely to awaken unsuitable traces, and to be overwhelmed by them. A child, for instance, cognised a vase of ferns as a pot of green feathers. We adults seldom make such mistakes because (1) the subjective factors are controlled by more clearly discriminated sensations, and (2) because the objects cognised have been perceived many times before, with such multifarious and clear sensations that the revivals of them now called up on account of the past processes of association are in harmony with the objective factors of sensation. The need of continual and concentrated observation by children is, therefore, very great. *They must be allowed to handle and actively deal with the objects to be perceived, so that they get a variety of sensations which supplement one another.*

We have seen that perception very early becomes illumined by ideas. In other words, it is not "mere" perception but *apperception* or *observation*. The instance of the child cognising the vase of ferns, although an erroneous observation, is a case in point. And all the other instances quoted are also cases of observation. It is important to consider the observation of the child from the point of view of the kind of ideas he usually employs. The very young child, left to himself, uses chiefly *particular* and *generic* ideas. He merely enumerates objects or persons. At about 8, *actions* are commonly noted. This involves a step in the direction of abstraction. From 9 to 10 *spatial, temporal, and casual relations* receive more attention. After this the various *qualities* of objects are more and more referred to. It is claimed by some that these stages are so marked as to enable a normal child's age to be de-

termined with fair accuracy by the replies he gives in observing a picture [1]

Correctness of observation shows considerable progress with advance in years At 7, every third element of positive statement is false At 14, only every fifth statement is wrong This, of course, is on the average Most mistakes arise with respect to the number of objects Teachers, then, must expect to receive incorrect answers ✓ They must not be disappointed or irritated by the mistakes of the children, but must cheerfully proceed to correct them, or, better still, to get the children to correct themselves by further observation. The mistakes with respect to number seem to be connected with the fact that children cannot grasp several objects together Some educationists are of opinion that we should delay our teaching of number There is no doubt that much effort is wasted when we try to teach something for which the development of the child is not yet adequate

The errors of young children in observation are no doubt largely due to their lack of sensory discrimination, wrong ideas being called up to overwhelm the actual sensations But the great suggestibility of young children is another important factor [2] They are extremely susceptible to influences determined by the form of question ✓ or by any other indication that they are expected to give a certain answer No very reliable information is at present

[1] Rusk *Introduction to Experimental Education*, p 70 Binet, a French psychologist, has used pictures in a similar way Thus a picture of a man pulling a cart is shown to the child An infant of three, when asked what he sees usually says little more than "man—cart," while a child some years older will probably say "A man pulling a cart along" According as a child s answers, in these and other tests, are above or below the usual standard of his age, his *mental* age is said to be above or below the normal.

[2] See pp 94 ff

forthcoming with respect to the correlation between suggestibility and age.

Teachers should in all observation lessons exercise great care to avoid questions which suggest either right or wrong answers. Questions of the former type are perhaps the more common. The children are led swiftly along, echoing the observations of the teacher, but doing very little real observation themselves. But many conscientious teachers are prone to inveigling children into erroneous observations and then "rounding on" them for their errors. This is discouraging to the children. By all means let us encourage independence of observation. But let us remember that the powers of children are very limited, that they are readily susceptible to attempts to lead them astray in any direction, and that discouragement is as harmful to independence as undue assistance. "The pupil may, through wrong treatment on the part of parent or teacher . . . suddenly become remiss and his efforts, mainly in a particular subject alone, fall off; the relations between the pupil and the teacher undergo a change, they lose confidence in each other, the pupil loses confidence in himself, and his work in all subjects suffers."[1]

We see, then, that ideas develop very early in the child's mind, and that these determine to a large extent what he observes. As Meumann puts it, "the old tenet, 'The development of the child proceeds from perception to ideation,' is as a general statement incorrect; it is only a partial view of intellectual development; the latter proceeds to a far greater extent from idea to perception, since the ideas controlling the process of apperception determine what is perceived and by them the gradual consequent progress of perception is stimulated."[2]

[1] Rusk, *op. cit.*, p. 120

[2] *Vorlesungen*, Band II., pp. 183-8.

But these ideas are not *mere* ideas They are the cognitive aspects of tendencies or conations The wholes thus constituted may be called *interests* Meumann often prefers to use the term *will* He writes, for instance "The child sees that to which his will to see is directed, not that which is brought before his senses, and the purpose to see is further guided by general ideas of what is to be seen "[1]

If we are to get the child to observe well we must bring before him objects and pictures which are not only suitable to his stage of intelligence but which appeal to his interests It becomes, therefore, very important to know what are the normal child's interests at the various stages of his development Unless we appeal to these we shall not get a large share of the child's attention

According to Herbert Spencer, the child recapitulates in himself the whole course of development of the race It is pointed out that he certainly does so on the bodily side, starting as he does from a single cell and developing through stages similar to those of the lower animals and of primitive man until at last he becomes a human being of modern type It is assumed therefore that his mental development takes a similar course Thus Herbert Spencer writes "The education of the child must accord both in mode and arrangement with the education of mankind considered historically In other words the genesis of knowledge in the individual must follow the same course as the genesis of knowledge in the race"[2]

If this is true, the child at different ages will have interests corresponding to those of our remote ancestors at different stages And we shall require to feed those

[1] *Op cit*, p. 189 [2] *Education* p. 67

interests with suitable material. Thus one writer, beginning with the child at the age of 6, prescribes the following as the chief interests for each successive year: "1. Hunter's life. 2. Nomadic life; grazing is a new occupation of man; lower animal life enters into the service of man. 3. Agricultural life. 4. Development of retail trade and small industries. 5. Development of wholesale trade; foreign commerce and great industries; growth of great cities."[1]

But it is not sufficient merely to state that the child's interests develop in this order. Only by observing the child can we determine with certainty what are his interests. When we do this, we see that there is indeed an element of truth in the stages sketched out; but that there is far from being a complete correspondence between the development of interests in the child and in the race. In so far as the interests of the race have gradually developed from absorption in the concrete wholes of perceptual activity, through stages in which more and more hidden qualities and relations have come to light, and have finally attained to consideration of things from many abstract points of view, we may agree that they furnish a rough outline of the general course of child development. "But a strict adherence to the historical stages of culture as a guide to curriculum is not possible. Let the stages of a national culture be represented by the letters of the alphabet, starting with A as the earliest stage, and let it be supposed that a child, whose individual development has brought him to the stage F, is living in the actual stage R of his nation's culture. Now, the child being a rational creature, the reaction of R upon F is inevitable; the child of stage F can, in the circumstances supposed, no more escape the

[1] Van Liew, *Outlines of Pedagogics*, p. 119

influence of R than he can elude his own shadow in bright sunshine The fact is unfortunate for the theory, for what is likely to become of instruction adapted to stage F for a child surrounded by R? He is no mere duplicate of the men of his race who lived in period F, *his* stage ought, in truth, to be indicated not by that letter, but by F + *x*, a stage which, it is assumed, has never been reached before"

Or, to put the matter in another way, we may say that the present advanced state of civilisation is the product of the collective efforts of millions and millions of human beings, each doing a tiny share which is now preserved *as a starting point* for others—in language, in buildings, in implements and machines, in social organisation and customs It is absurd to imagine that any given child could recapitulate in his own life even a small fraction of this advance But, being born in the midst of all this civilisation, he grows up with it as his constant environment, and he quickly becomes familiar with thousands of things, each of which has cost years, if not centuries, of development in the life of the human race

"The really illuminating category, then, under which to describe the child s activities, and one which includes them all on an equal basis, is that of present function Their backward reference to the life of a remote ancestry is of far less moment to the educator than the fact that they are essentially the manifestation of a developing psycho physical organism, and that in some way they make possible the activities of later stages and in the end condition the adequate performance of the functions of maturity From this standpoint it becomes of even greater importance than before to know accurately from a study of children them

[1] Adamson, *The Practice of Instruction*, p. 112

selves just what we can call functions and activities of an immature mind." [1]

We may roughly divide the period of childhood into three stages.—(1) *First period of childhood*, from $2\frac{1}{2}$ to about 6 or 7; (2) *Second period of childhood*, from 6 or 7 to 9; (3) *Pre-adolescent period of childhood*, from 9 to puberty.

The interests of the *first period* are almost entirely centred in play. Physical activity is the most absorbing interest. The objects with which the child deals are not attended to so much for their own sake as for the activities which they render possible. But as imagery arises in the child's mind, he is easily diverted to activity in which this is involved. For, it must be remembered, his images are probably more vivid, and consequently less distinguishable from percepts than those of the adult. Often the imaginative activity is combined with the perceptual. Astride of a stick a child considers himself to be riding a horse. Seated in a chair he is driving a coach. A few bricks make up for him a train. We adults are inclined to look with contempt at the poverty of these inventions. But to the child they are probably rich with reality.

Imitation, of course, plays an important part at this period. The activities of the adults around him provide the child with a wealth of imagery with which he continually plays, needing often only the most slender support from the concrete of actual perception.

And since his concrete environment is not sufficient, even when thus economically employed, to support his budding imagination, he will delight in the greater freedom which myth, fable, and fairy tale open up to him. And here again, those adults who have lost the keen relish of fiction

[1] King, *The Psychology of Child Development*, pp. 161-2.

are inclined to doubt the utility of it. But these exercises in imagination are probably defining and refining ideational machinery which will be of great service later on

Curiosity is rampant during this period At first it is satisfied by further manipulation and contemplation of concrete objects The child will take a watch, and handle it, hearing it tick and regarding it again and again But as ideas and images develop, *questions* are poured forth *Why, What, How*, are continually on the child's lips, unless he is suppressed or ignored And he is satisfied with the crudest of explanations For his ideas will often carry him no further And it would be foolish to attempt anything more elaborate

"The inability of the child, at this time, to grasp and be interested in any very large wholes is seen in the fact that children of six and seven, in telling what they wish to become when grown up, always name some prominent detail in the adult activity of their immediate environment, never the occupation as such For instance a little girl who really wishes to become a housekeeper will say rather that she wishes to wash dishes or sweep A boy, instead of saying he wishes to become a blacksmith, will say he wants to shoe horses We may say, if we wish, that this is due to the inability to make abstractions at this age This is no doubt true, but the point is that it is the striking detail, and not its setting, that is of interest "[1]

Above all, we must note the fluidity of the child's mind at this period No interest with him lasts long at a time He will turn readily from one thing to another We must not, therefore, expect from him concentrated attention of long duration

In the *second period* there is no sudden change Play,

[1] King *op cit*, p 179

curiosity, imagination, and *imitation* still play a large part in the child's life. But there gradually arises greater ability to concentrate attention for comparatively long stretches of time. There is, thus, a beginning of interest in details. But this is generally in close connection with physical activity. The child becomes keen on acquiring skill. He is ready to imitate all kinds of activity, so long as he is confident of success. But he is usually unwilling to attempt even simple things unless he feels that he can do them. Further, he has now an eye on the results of his operations.

The child's range of ideas widens rapidly during this period. He takes an interest in the broader environment of which his *daily world* is only a part. *He listens* with keenness to descriptions of the people of other lands, and eagerly scrutinises any pictures or objects relating to them. *Striking biographies* and *stirring events* are *extremely* attractive to him, and continue to be so even beyond this period.

Games are largely individual, though competitive, during the early part of this period. Imitation still plays a large part. But children at this age have usually insufficient powers of adaptation and of perseverance to carry on group games with much success. Running games are popular with both sexes; in the case of boys they are very much liked, and continue to be so, but with girls they are not so much esteemed and decline rapidly in attractiveness.

This seems to be a period of bewilderment and maladjustment. There is evidence of uncertainty in the midst of the new demands made upon the child. Whereas in the first period a very large proportion of boys unhesitatingly choose the occupation of their fathers as their ambition, a much smaller number now do so. Moreover,

nearly a half of them give no reason for their choice of occupation, whereas both before and after this period there is much more decision In these matters, however, there is further evidence of a widening field of interest and knowledge. Girls want to be teachers or dressmakers Not a few boys want to be soldiers But whereas it was the drum and the uniform which attracted them in the first period, they have now some idea of patriotism

In the *pre-adolescent period* there are marked changes. Social tendencies develop strongly, and group or co-operative games are extremely attractive. There is, of course, competition in these, but it is rather between group and group than between individuals This is the age when *esprit de corps* can be highly developed. The boy is willing to sacrifice his own glorification to that of the group of which he is a member. Much use of these tendencies can be made in the way of stimulating the boys in their work

This development of the social consciousness brings with it great susceptibility to the influence of others And it is to be noted that evil influences have now as great a chance as good ones Perhaps, indeed, they have more chance. For that attitude of rebellion against restraint which is so marked a characteristic of adolescence is beginning to show itself. Since this is the period when permanent sentiments begin to arise, it is extremely important to watch over the lines on which the boy or girl is being directed

A prominent characteristic of this period is that of making collections. The instinct of collecting is also to be noticed in the earlier periods. But in these it is more or less sporadic, and there is little perseverance. Now, however, boys will persist for weeks and months in getting together specimens of various kinds Stamps, picture postcards, and cigarette pictures are among the most common

things collected. But the instinct in question may be utilised for many other purposes. Leaves, flowers, pictures illustrating history or geography lessons, quotations from favourite authors, shells, fossils, and many other things can be collected and arranged by the children, who in so doing will both increase their knowledge of their environment and develop interests of an elevating description.

An interest in puzzles seems to be a special characteristic of this period. Some regard this as an evidence of mental freedom, a breaking away from the narrow limits of childhood. Interest in mechanical puzzles seems to develop first (at about 11). But this is soon followed by keenness in the geometrical, arithmetical, and language varieties. For, with the growth of ideas, there develops the impulse to use them—in other words, to *reason*. Reasoning in the truest sense of the term—the use of abstract ideas in the solution of problems—makes rapid strides during this period. Few teachers seem to take advantage of these facts. The problems set in schools are too often uninteresting tasks taken from books and lists of dull "examples." If only some of these could be modified and so presented that they really appeal to the pupils as puzzles, much more interest would be taken in them, and greater perseverance evinced in working them out.

Imitation is still a prominent feature during this period. Indeed, the collecting and puzzle interests just referred to *are in many cases aroused to their full pitch on account of* imitation of others. The imitation of this period, however, begins to show a more generalising tendency. The child of eight imitates specific acts. Older children, and especially adolescents, get behind the specific act to the attitude or emotional tendency prompting it. This is one of the great *factors in the susceptibility to the influence of others*, especially of teachers and friends, which we have noted as

a characteristic of this period This susceptibility goes on increasing after puberty, culminating in boys at about 16 and in girls at about 14

Much more might be said with respect to the interests of children at different ages We have only been able to refer to the most prominent of them here But sufficient has been said to indicate how necessary it is to get to know the tendencies, innate and acquired, which children possess at different stages of their development In the last chapter we emphasised the close connection between interest and attention It might indeed be said that attention is simply an aspect of interest If therefore we wish to gain the child s attention, and direct it into certain channels, we must study the child's interests, so that we can use them to the best advantage

QUESTIONS ON CHAPTER VIII

1 How is it possible to make the transition from home to school an easy one for the child?

2 State briefly the essential principles of Madame Montessori s system of education.

3 Point out some marked differences between the perception of the child and that of the adult.

4 Sketch briefly the stages of observation through which a normal child passes, stating the nature of the ideas which largely govern the process in the different stages.

5. How far is it safe in education to follow the course through which the race has progressed?

6. State briefly the chief interests of a normal child of 6

7 What are the prominent characteristic tendencies of a normal child of 8 to 9?

8 What changes in the field of interests would you expect to occur in a child during the period from 9 to 12?

9 Why is it important that the teacher should know the of children at different ages?

CHAPTER IX.

THE ECONOMY OF ATTENTION.—FATIGUE AND ITS TREATMENT.

Interest is the great sustainer of attention. But the child has varied interests. And in the period during which the self-regarding sentiment in its highest form—the "sense" of duty—is imperfectly developed, there is great fluidity in his attention. There is nothing to come to the aid of a desirable interest when it is confronted by another which is on the point of overwhelming it. A boy may be interested in his history book; but a sudden invitation to cricket may completely banish all thoughts of history. He may be too young and too undeveloped to think of consequences, of aspirations for the future, and so forth. And he succumbs. In other words, he fails to make an effort of volition.

In very young children this fluidity of attention is most marked. None of their interests have a great hold on them, and one can easily be displaced by another. This weakness, however, has its advantages as well as its disadvantages. For we can utilise it to replace an undesirable interest by a desirable one. Thus a child who is crying for more sugar can sometimes be made to forget his want by having his attention drawn to some curious object or toy, or by the telling of a story. But when the child reaches the school age, we try to develop habits of fairly

prolonged attention in one direction. We should not, of course, attempt to train the child in this way at the expense of his health. And in most infant schools the need of comparatively frequent change is met by short and varied lessons. During each short lesson, however, the teacher attempts to keep the child's attention fixed in one direction.

But she must not be in despair when attention wanders. She must realise that the children are merely obeying natural laws. And she must lay her plans not against these laws, but in harmony with them. Since almost any new or strange occurrence is likely to capture the children's attention, the teacher should do all in her power to avoid these distractions. As far as possible, nobody should be allowed to enter the room during the course of a lesson. Pictures or other attractive objects which are not connected with the subject in hand should be carefully hidden from view.

In such ways the teacher avoids the effects of sudden or attractive stimuli which tend to divert attention. But often she can also produce some which will work in her favour. The modulation of the voice, the change from loud to soft, decrease or increase in speed, sudden pauses, a little movement from place to place—all, of course, more or less in harmony with the circumstances—will aid the teacher in recapturing attention which is on the point of wandering.

Consideration must also be given to the physical conditions. The children must be in good health, well fed and clothed, the air must be pure, the temperature about 60° F., and the room well lighted. All these physical circumstances are necessary if the children are to give their keenest attention. The absence of any or all of them will not only tend to depress the energy of the body, with

which that of the mind is most intimately involved, but it is likely to introduce interrupting elements. Any physical discomfort is painful, and painful impressions have a very great power of arresting attention.

But when the strongest possible interests have been aroused, and when all the other conditions to which reference has been made, both in this chapter and elsewhere, have been secured, there still remains a source of inattention of which up to the present we have taken little account. Keen activity in any direction—whether it is chiefly of the mind or of the body—produces *fatigue*. And fatigue depresses the mental and physical activities more and more as it increases, until in extreme cases one is incapable of anything.

"With regard to the influence of age, younger children are very much more fatiguable than older ones. Six-year-olds often show a noticeable degree of fatigue after one hour or even half an hour of school work, while in the case of children between thirteen and fourteen any increase of fatigue is often only demonstrable after the third hour of teaching. The fatiguability of children seems therefore to be all the greater the younger they are, and *vice versa*."[1]

Since fatigue is produced in children much more readily than in adults, it is extremely important that the teacher should know something of its causes and cure.

Fatigue is usually said to be of two kinds—*mental* and *bodily*. Mental fatigue is due to changes in the brain tissue, and it may consequently be referred to as *brain* or *cerebral* fatigue. Bodily fatigue is largely due to changes in the muscles, and may also be called *muscular* fatigue.

What, then, are these changes? All tissue, nervous as well as muscular, is partially consumed during activity.

[1] Meumann, *Vorlesungen*, Band II., p. 127.

There is a process of burning or decomposition by means of oxidation constantly going on during the functioning of the tissue. The oxygen necessary for this process must be supplied from the blood circulating in the tissue. Hence the need of pure blood if the functioning is to be vigorous. And since pure blood depends upon pure air, we see now why the latter was mentioned above as one of the physical conditions of attention. The decomposition which takes place is, of course, slow, and involves only a small portion of the whole tissue. But it leaves waste products which are poisonous and which are usually known as *toxins*. These find their way into the blood, and can be thus carried away and finally removed from the body. But if vigorous activity is continued, they accumulate faster than they can be removed. Both tissue and blood become charged with them.

These two changes—the breaking down of tissue and the accumulation of toxins—are the causes of fatigue. Of the two the presence of toxins seems to be the more prominent under normal circumstances. For it has been shown by experiment that if the toxins are removed, a revival of activity ensues. But when such experiments are repeated many times on the same tissue without any recuperation being possible, the latter finally becomes incapable of any further activity, because it has lost so much of its substance. Under normal circumstances, however, the blood not only takes away the waste products but recuperates the tissue with new supplies

Now the cells of the nervous system, and especially those of the cortex of the brain, which is the seat of consciousness, are the most sensitive of all to the effects of the toxins And since the blood circulates throughout the body, poisons produced in any part of it, if they cannot be removed at once from the blood, very soon affect the

on land which produces a very small return for his exertions, so we should refrain from making great efforts when the results are very small.

The teacher, therefore, should keep a watchful eye on the degree of fatigue which his pupils reach. Various means of measuring fatigue have been devised. Some attempt to estimate it by physical tests, others by mental ones. None of these means are absolutely reliable. And even if any of them were so, they would be of little use to the teacher in his class-room. For, even if he were competent to employ them, he could not be continually interrupting his work to deal with them.

Now fatigue, when it reaches a certain stage, usually produces conscious effects—"at first a mood of indifference, then a disinclination to pursue the fatiguing work, together with the desire for a change. We are 'tired' of this work. Then a feeling of languor becomes evident, a feeling that we can't get hold of things, though we still want to. We feel weary for any kind of work (feeling of weariness). Finally, we feel exhausted, and crave nothing but rest and sleep."[1]

We adults are often guided by such conscious manifestations. And it might be suggested that the teacher should ask the children whether they feel tired. But even in adults such feelings are often misleading. Some people experience them when more objective tests indicate that they are not fatigued to any great extent. Others go on until they are greatly fatigued without experiencing any such feelings. The state of boredom, resulting from lack of interest in the work itself, may also be easily mistaken for fatigue. There is, it is true, a connection between lack of interest and fatigue. When we are interested in

[1] *Mental Fatigue*, Offner, translated by Whipple, p. 16.

the subject we are studying, work goes on more easily; but when we have to *borrow from some remote interest* in order to secure application to the matter in hand, there is some friction involved in the process, so that we become fatigued more readily. The teacher, of course, should always endeavour, especially with young children, to awaken an interest either in the subject itself or in something which is closely connected with that subject. But this cannot always be done. The higher forms of voluntary attention must be developed. It is not advisable, therefore, to be guided entirely by the momentary likes and dislikes of the pupils; for it is these which would largely influence the child in stating whether he is tired or not. The teacher, therefore, must be guided by external or physical manifestations. Though these cannot give him an exact measure of the fatigue of his pupils, they are tolerably reliable indications.

We have seen that fatigue involves a decrease both in the complexity and in the amount of activity. This is shown in the quality and quantity of the work produced. "Efficiency gradually diminishes; at first *qualitatively* (we make more errors), then *later* on *quantitatively* (we accomplish less than we did at first). Our attention exhibits marked fluctuations. We become more easily distracted, and find it progressively more difficult to maintain a line of thought and to bury ourselves in a problem. Children are then likely to begin to play during school work. The child, in such a case, may be said unconsciously to protect himself from fatigue by inattention, and, following Kraepelin, we may call his inattention a 'safety valve.' The observant teacher who knows his pupils possesses in this effect of fatigue a valuable sign of warning."[1] Instead of becoming angry at fidgeti-

[1] *Op. cit.*, pp. 13-14.

ness and inattention produced in this way, the teacher should recognise the inevitable oncoming of fatigue and take means to deal with it. Of these means we shall presently speak. But first it is well to note other signs of fatigue. And here we cannot do better than to quote the following words of Dr. Warner, one of the most eminent authorities on children, viewed from the medical standpoint.

"Among the signs which indicate fatigue, I may mention the slight amount of force expended in movement; there appears to be a lessened total of force passing from the nervous system to the muscles. There is often asymmetry of posture and movements, seen in the balance of the head, the spine, and the hands. There may be accompanying irritability, much movement upon the slightest touch, or movements apparently spontaneous. As you look at the child, you see too little movement on the average, or occasional jerky movements not controlled by circumstances. The eyes may wander and not be distinctly fixed by the sight of objects around, the face is toneless, less lively-looking, less mobile; possibly there may be fulness under either eye. There is asymmetry of action; the fatigued nerve-centres being unequally exhausted. Spontaneous finger-twitches, like those of younger children, may be seen, and slight movements may be excited by noises. The head is often held on one side, the arms, when extended, are not held horizontal; usually the left is lower; the hand balances in the weak type of posture, often again most markedly on the left side. The direct effects of gravity determine the position of the body to a greater extent than in the condition of strength; hence the spine is bent. If this condition tends to pass on into sleep, the eyelids are closed."[1]

[1] Warner, *The Study of Children*, pp. 143-4.

The weak type of hand balance is described by Warner under the name of the "straight hand w thumb drooped' as follows "It is similar to the straig hand, but the thumb, with its metacarpal bone, fa slightly, thus approximating the latter towards the pal I was once able to point out this sign to the headmast of a large school I had looked over the lower classes the school without noticing any unusual signs among t

But fatigue is a necessary consequence of all work. We are not concerned, therefore, with avoiding it entirely, but with allaying it before it becomes excessive. To this end two means have been suggested—*change of occupation* and *rest*.

Change of occupation acts in the first place by making the work more interesting and consequently less fatiguing. Children are especially sensitive to novelty; they will respond to something new when they are quite tired of all the other things to which they have been attending. But change of occupation has a still more important effect. It exercises new parts, both of the nervous and muscular systems; and the parts previously exercised have now a chance of recuperating. In other words, it gives some opportunity for the second of the two means suggested to come into operation. Rest can take place in some part or parts of the body while others are active. During rest the blood is able to carry away the toxins and replace the lost tissue.

It has already been indicated that when children begin attending to other things than the lesson in hand they are, all unconsciously, using the principle of change of occupation as a means of avoiding excessive fatigue. There is, indeed, always a tendency for activity to shift from one part to another when the first is becoming fatigued. Let the reader gaze intently for some time at the accompanying diagram. He may first interpret it as a relief, the small square appearing nearer than the remainder. But after attending to it in this way for some time, he may notice the other possible interpretation arising without any effort to change

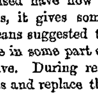

Fig. 13.

But change of occupation is of no use when fatigue is already excessive. For the blood is now charged with toxins. On the one hand it cannot recuperate the tissue already used, and on the other it carries poison to the other tissues, including the part about to be employed. When this is the case, we have *general* fatigue, as distinguished from the *specific* or *local* fatigue due to the activity of one part. But it must be remembered that the latter, when prolonged or excessive, induces the former in the way we have described. In spite of all changes, then, *general* fatigue will increase unless complete rest is given. This happens during the course of each day with most well-employed individuals. At night general fatigue has become fairly, though, let us hope, not excessively pronounced, no change of occupation can effect much improvement, and the complete rest of sleep is necessary.

Sleep in normal and healthy individuals entirely removes fatigue. But minor rests throughout the day afford partial recoveries. These occur during meals. And further rest should be taken after each meal, to allow the process of digestion to proceed undisturbed. In careful attempts to measure general fatigue, it has been found that usually it gradually increases up to the mid-day interval, after which it is less, though by no means absent. It increases during the afternoon to a greater degree than in the morning, but is somewhat brought down again after the tea interval. It then gradually increases until the end of the day. These fluctuations, however, vary considerably in different persons. They are probably greatly affected by the habits we form. Those who are accustomed to do a great deal of work in the evening seem often almost as fresh then as in the morning.

With children in school we provide an additional break in the middle of each session. This should be of at least

inquire as to the amount of sleep which the child gets. If he finds that insufficient sleep is obtained, he should use what influence he has to secure more.[1] Should he be unsuccessful, he must require less work from the child.

Careful observations seem to show that the average child of the primary school is not unduly fatigued by the school instruction. This does not mean that we need not worry about the amount of fatigue induced by our lessons. For there is the further question of the effectiveness of the efforts made by the children. By arranging that the children attack the most difficult subjects when they are at their freshest we shall obtain better results than by an indiscriminate placing of the lessons. Just as the athlete who wishes to accomplish a good performance, especially if he desires to break a record, selects a time when both he and his conditions are at their best, so the teacher who has to give a lesson demanding much concentration of thought on the part of the boys would do well to arrange it for the most favourable time of the day.

The most favourable time is the early part of the morning. The second lesson-period is better than the first. For there is nearly always a "warming up" process in the early stages of work. A fairly difficult subject may be placed at the beginning, and the second lesson should be devoted to the most difficult. The easiest subject should come at the close of the day.

Which are the difficult subjects and which the easy ones must not be decided off-hand. In most cases the general opinion of teachers is correct. Thus arithmetic is very

[1] As to the exact length of sleep necessary for children at different ages, various statements have been made. Further investigation is necessary. Probably different types, even at the same age, require different amounts. See "The Sleep of School Children," by Terman and Hocking, *Journal of Educational Psychology*, March, April and May 1913.

fatiguing, while drawing is one of the least fatiguing. But much depends on interest, and this may or may not be aroused to any large extent by a given teacher. Further, children vary considerably in their likes and dislikes. We can only, therefore, make general statements which apply to most cases. Careful tests have been made on children after lessons in each subject, and it has been attempted to arrange the various subjects in the order of their power to arouse fatigue. There has been considerable difference in the results of different observers. And much more investigation will be necessary before fully trustworthy statements can be made. One result, however, obtained by most observers is that physical exercises, taken seriously as a school subject, is very fatiguing. Some teachers have been inclined to regard it as recreative. It must be remembered, however, that very close attention is necessary on the part of the boys to the instructions and commands of the teacher, and to the exact performance of the movements which follow. There is further, of course, the muscular work done in the movements. But it is probable that the alert attention is the most fatiguing feature of such lessons. Kemsies arranges the subjects of the secondary school with respect to power of producing fatigue in the following order:—

1. Physical Exercises (the most fatiguing lesson).
2. Mathematics.
3. Modern languages.
4. Scripture.
5. Mother tongue.
6. Natural History and Geography.
7. History.
8. Singing and Drawing (the least fatiguing lessons).[1]

[1] Kemsies, *Arbeitshygiene der Schule*, Berlin, 1898, p. 34.

Such results, however, cannot be accepted as conclusive until they have been verified by further investigation. With regard to physical exercises, Claparède proposes to distinguish two classes, the "serious" and the recreative. "We ought, therefore," he says, "to separate into two categories the gymnastic lessons according to their object; *pedagogical* gymnastics would be placed in the morning, and *hygienic* gymnastics at the end of the day's work."[1] These two would correspond roughly to what are often called *drill* and *organised games* in our English elementary schools.

Although much remains to be ascertained with respect to fatigue, what has been found out already is of vast importance. "Statistics show that school programs which ignore the law of fatigue are most wasteful in results. Dr. W. O. Krohn has tested about forty thousand children with reference to the period of the day when memory is most retentive. He found that if the subjects were taken indifferently during the first school hour of the day, the average retentive power of the children was eighty-nine per cent.; for the last hour of the morning, sixty-three per cent.; for the first hour of the afternoon, seventy-five per cent.; for the last hour of the afternoon seventy-seven per cent. This shows very conclusively that memory is twenty-six per cent. more effective during the first morning hour than during the last. When the order of the subjects was reading, grammar, arithmetic, geography, and history, the average was eighty-nine, fifty-eight, sixty-eight, and seventy-six per cent. respectively; when the order was arithmetic, elementary science, reading, drawing, geography, and history, the average was eighty-nine, seventy-nine, eighty-two, and eighty-six per cent. This last arrange-

[1] Claparède, *Psychologie de l'Enfant*, p. 379.

CHAPTER X.

MEMORY AND FORMAL TRAINING.

We have already dealt with memory at some length incidentally.[1] In the widest sense of the word—that of retentiveness of traces of past experience—memory is an essential factor in all conscious activity. We have seen that perception, the simplest form of cognition, can only develop by reason of the fact that our various acts of adaptation to the things around us leave behind them traces which, though they soon lose all conscious accompaniment, can be so far revived, on account of the associations into which they have entered, that they once more involve some amount of consciousness. In "mere" perception, the consciousness due to this revival (as distinguished from the whole consciousness involved in the complete perceptual process) is not sufficiently definite to stand out as a separate element; it determines, however, that feeling of familiarity which we call *recognition*. But often some of the traces of past experience are so vividly revived that they constitute distinct elements over and above mere recognition: ideas and images arise to supplement the process of recognition. When this occurs, perception has been raised to the level of *apperception*. The simplest and most common form of this process is that in which the *name* of the thing arises. But this usually

[1] See especially Chapters III. and V.

ment of studies increases the retentive power of the average pupil over that of the hit-or miss program sixteen per cent for the third hour, seven per cent. for the fourth, and nine per cent for the last hour of the day In other words, a rational arrangement of the school program increases the memory power of the children from ten to twelve per cent for the day as a whole—*a saving of one year in ten in the school life of the child by this means alone* '[1]

QUESTIONS ON CHAPTER IX

1 What are the various meanings which may be given to the expression, ' I am tired of it "?

2 What do you understand by the terms *mental* and *bodily fatigue*? What connection is there between the two?

3 What do you understand by the terms *specific* and *general* fatigue? What treatment is necessary in each case?

4 What are the outward and visible signs of fatigue?

5 What arrangements would you make in framing a time table in order to avoid excessive fatigue throughout a school.

6 ' All work and no play makes Jack a dull boy Give a scientific justification of this statement.

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[1] Taylor, *The Study of the Child* (Appleton & Co) pp. 201 2 The inferiority of the results for the first hour of the afternoon as compared with those of the last hour may possibly be due to the fact that a start is made too soon after the midday meal, *i e.* when the process of digestion is still making great demands on the supply of blood, and thus depriving the brain of a most important requisite for its highest activity Some authorities advise two clear hours of rest after this meal.

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occurs so readily, on account of the strong association which has been formed by frequent repetition of the name on the appearance of the thing, that one is doubtful whether such an automatic process, approximating as it does to mere recognition, should be called apperception The example, however, serves to show that no clear demarcation can be made between recognition and apperception

But once an idea is in the mind, it may lead to the resuscitation of other ideas For in the course of past experience it may have formed a large number of associations In this way we get trains of thought, often accompanied by more or less definite imagery Sometimes these trains of thought proceed apparently at random, the ease with which one idea can call up another being the chief determining factor, at other times they are guided by a purpose or directive idea which inhibits or prevents certain ideas from arising, but favours or welcomes others In the former case, we have what may be styled *reverie*, in the latter, we have either the more serious forms of imagination or that still more serious business which is known as reasoning These processes have already been described in some detail.[1] All that we need note here is that they involve that more definite recall of ideas which goes beyond mere recognition It is to this definite recall of distinct elements of past experience that the term *memory* is most usually applied

Not long ago, it was the fashion to despise memory, as a mere accessory to intelligence The formation of associations seemed so simple a process Now, however, it is seen that such associations are an essential basis for all the higher processes of cognition And there is a great revival in the respect paid to memory

[1] See especially Chapters III and V.

Reverting to the wider use of the term, we may note that not only does perception involve memory, but the fixation of habits and tendencies of all kinds depends also upon it. For all these involve connections or associations. All education, indeed, in so far as it involves profiting by experience, as distinguished from inevitable growth and development, is an affair of memory in this wider sense.

Not only does any given mental process depend upon memory in the form of resuscitation of elements of *past* experience, but even as it proceeds it requires an *immediate* form of memory within itself. A normal child of six can repeat accurately a sentence of sixteen syllables after one hearing of it. When it hears the last syllable of the sentence, the preceding ones have not entirely disappeared. Every mental element has thus a tendency to persist or *perseverate* for some time. No mental process of any complexity could be carried through without this property. It is impossible, indeed, to conceive what a mental process could be without this retention of the "just past." For if at any given instant of such a process the traces of the immediately preceding instants could be completely obliterated, we should have to begin our effort of comprehension or adjustment to the "new" situation over again. And the traces of this new beginning being immediately lost, we should have to recommence. And so on.

This *perseveration* of mental states may perhaps also be explained on the basis of connections between neurones. When a given neurone has once been excited, it tends to attract or drain energy from all other neurones which possess any, and thus to continue its activity.

Now this drainage tends to establish, for a time at any rate, the paths along which it occurs. And if the excitement of the original neurone is very intense the many paths of drainage may remain more or less open for an

only other way is by repetition. When we cannot strike hard enough to drive the nail home with one or two blows, we can produce the same effect by a large number of weaker blows. And even when interest is aroused, repetition often comes in as a supplementary aid. The boy who has read of the score of C. B. Fry is fond of reverting to it again and again, thus rendering his memory more and more firm. We see, then, that repetition, if frequent enough, will always produce the effect desired. Interest, however, is not only favourable to repetition, but renders a large amount of it unnecessary.

It is clear, then, that memory always depends on the formation of connections or associations. These associations are always formed in one way—by attending to the things to be associated either simultaneously or in close succession. For this reason the expression *association by contiguity* is sometimes used. But this expression implies that there are other forms of association. And some psychologists have held this view. We hear, for instance, of *association by similarity* and of *association by contrast*. A little consideration, however, will show that the principle of association *by contiguity* is at the basis of all such connections. All suggestion of things not present is due to a process of *redintegration*: things found or put together in past experience tend to call up one another.

After seeing an old man in company with my grandfather I may recall the latter to mind on seeing the former by himself. This is obviously due to the association by contiguity which was formed during the first experience. But, long after my grandfather's death, another old man *whom I have never seen before* may remind me of him. The supporters of association by similarity as a distinct kind of association maintain, therefore, that in such cases there must be another and totally different kind of link—

time after the event so that, whenever there is no great excitement of any other part of the brain to attract energy, the available energy runs through the persisting paths and re-excites the original neurone Not only, therefore does a very intense state of consciousness tend to perseverate at the time of its original occurrence, but even when it has been replaced by others it may recur spontaneously If a tune has 'caught on" with us, we find it continually springing up in our minds If we have seen a man run over, the terrible experience tends to be revived again and again

This spontaneous revival, however, occurs only in the case of *very* striking experiences In the great majority of cases revival is only possible because a limited number of *very definite paths* have been worn between two or more specific neurones, so that the excitement of one leads more or less directly to the excitement of the others In other words, definite *associations* have to be formed between certain ideas Such definite links can be made if the two elements or experiences to be connected are attended to together or in close succession And they are most definite and lasting when the two elements make deep impressions This is the case when the things attended to are interesting Thus a boy who is keen on cricket will remember the score made by C B Fry on a given occasion after one glance at the newspaper The more we can get the boy into the same attitude of mind with respect to his school work, the more lasting will be the effects of his learning If we can get him as keen on circular measure, he will readily remember that the value of $\pi = 3\ 14159$

But unfortunately this interest is often to some extent lacking And yet we must form definite and lasting connections in many cases. How can this be done? The

only other way is by *repetition*. When we cannot strike hard enough to drive the nail home with one or two blows, we can produce the same effect by a large number of weaker blows. And even when interest is aroused, repetition often comes in as a supplementary aid. The boy who has read of the score of C. B. Fry is fond of reverting to it again and again, thus rendering his memory more and more firm. We see, then, that repetition, if frequent enough, will always produce the effect desired. Interest, however, is not only favourable to repetition, but renders a large amount of it unnecessary.

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the link of similarity For I have never seen the two men together, or, indeed, thought of them together, before

But, looking more closely into such a case, we find that there is still redintegration based on links of contiguity The bald head, the grey eyes, and long white beard stir in me the same feelings which I had formerly when I looked at my grandfather But these feelings *were connected with the other attributes of my grandfather* These other attributes are now aroused *to complete the old picture*

The chief difference between this case and the one cited immediately before it is that it is not the *whole* of this old man that recalls my grandfather but only a *part*—that part in which the two are identical Since that part has been associated in the past with the remainder of my grandfather, the whole of that former experience is now revived In so far as a part only of the whole with which the mind starts has to be attended to before suggestion of another whole can occur, some *analysis* is necessary As, therefore, the individual makes progress in abstraction or analysis, much suggestion can occur in this way "In the early stages of experience suggestion by similars is dependent on mere superficial resemblance In later stages there is a suggestion by similarity in more deep seated characters "[1] Much of the beautiful imagery of the poet and many of the hypotheses of the scientist are due to the working of this form of suggestion

Coming lastly to what has sometimes been called *association by contrast*, we may ask, Why does *white* suggest *black*, *virtue*, *vice*, *weakness*, *strength*, and so on? Now it has been shown in dealing with the development of ideation that we come upon our abstract ideas by means of comparison And the most striking form of comparison is

[1] Lloyd Morgan *Psychology for Teachers* p. 82

that in which two opposed qualities are attended to in alternation. But this offers just the conditions for *association by contiguity*. We see, then, that suggestion of opposites is a most striking instance of the working of the one and only law of association.

All learning is an affair of associations. But everything that we learn is not entirely new. A piece of poetry, for instance, usually includes many connections with which we are already familiar. And the most important of these are the *thought-links* to which reference has already been made.[1] In causing children thoroughly to understand a piece before they attempt to learn it, we are not only developing their interest in it (which in itself will render necessary a smaller number of repetitions) but we are reviving in their minds the connections which already exist. Learning thus involves not merely the forming of new associations but the utilising of strong associations which have already been formed.

Sometimes, indeed, when no immediate use can be made of any thought-links or other strong associations already existing, it is worth while to form additional associations which are not necessary in themselves, but which by their mediation enable us to utilise some of our well-established connections. This is the basic principle of all systems of *mnemonics*. Thus historical events have, as a rule, no obvious connection with their dates. But, if we associate each figure with a consonant, it is possible by inserting vowels to construct some word which *has* some thought-link with the event. "For this purpose a code is prepared of the following type (after Feinaigle)—

1	2	3	4	5	6	7	8	9	0
d	*n*	*m*	*r*	*l*	*j*	*k*	*v*	*p*	*s*.

[1] See pp. 59 60.

Each figure or digit should instantly suggest to the student the corresponding letter as shown above The date of the first Crusade was 1095, which by the code gives *dspl*, suggesting the mnemonic word "despoil" or ' display," as the student thinks best. The latter word may suit one who admires the crusaders, with the phrase '*display* of chivalry", the former would perhaps be adopted by those who regard some of the knights as mere marauders '[1] This is only a single example from one of the systems of mnemonics

There are many varieties of such systems Some, for instance advocate the use of any strong place associations which the individual has already established—especially where thorough going thought-links cannot be employed Thus when a speech or a lesson consists of paragraphs or sections which cannot be connected very logically, one is assisted in learning the paragraphs or sections in the desired order by associating each of them with a separate room of a well known house The rooms must have been numbered consecutively (mentally at any rate) and each paragraph or section is assigned to the room whose number corresponds to the order of the paragraph or section in the speech or lesson In giving the speech or lesson, the individual proceeds mentally through the house, dealing with the "contents" of each room.

But, with all our ingenuity in using thought-links or other associations already existing, there usually remains much to be done in the way of forming new associations And since very great interest is not always present, we have to resort to repetition

Now repetition is a necessary evil To have as little of it as possible, we must know how to get the best results

[1] *Harmsworth Encyclopædia*, Article on 'Mnemonics.'

from such work. A good deal of experimental work has been done on this matter, and the following results have been obtained. Since we are concerned with school work, we will suppose throughout a task which is often given in school—that of learning by heart a short piece of poetry which has been carefully explained to, and appreciated by, the children.

It has been found that to continue repeating from beginning to end is better than to attack a stanza at a time. The reasons for this are fairly obvious. The poem as a whole is kept in view, the details, each in its proper place, being gradually rendered more and more clear and definite. All the thought-links between the various parts of the piece are thus utilised to the best advantage. Further, no irrelevant associations are fixed, only to be painfully checked and replaced by the right ones later on. When, however, one stanza is learned at a time, the attention runs from the end of each stanza to the beginning *of the same stanza*, thus forming an association which has later to give place to one between the end of the stanza and the beginning *of the next one*.

It has been found better to spread the learning over several days than to attempt the learning of the whole in one day. Thus, if a poem is to be learned during a given week and reproduced on the following Monday, four repetitions of it on each of the five school days would produce a better result than twenty on the last day (Friday). One reason for this is that local fatigue soon sets in, so that when a few repetitions have been made any others immediately following produce less effect. There is also the falling off of interest, due to monotony. But the chief factor seems to be the question of the "age" of the associations. "When two associations are of like strength, but of unlike age, repetition increases the strength of the

older more than that of the younger association "[1] "The more the repetitions are distributed, the more does one work with old associations, whereas when all the repetitions come together, recent associations only are employed, and the effect of their consolidation is lost "[2]

There is little doubt that some sort of consolidation or further fixing of connections takes place during the period following the learning The blood removes the toxins produced and seems to restore the nervous tissue *on the lines laid down by the preceding changes* A student, having repeated something overnight and failed to do it correctly, sometimes finds himself easily able to do so on the following morning Mr Ballard has shown that children often remember more some days after learning than they could when tested at once [3] And the writer, working with Dr E O Lewis, has obtained similar results [4] Professor James emphasises the fact by quoting a German author to the effect "that we learn to swim during the winter and to skate during the summer "[5]

All this emphasises the value of a pause after learning If we go on at once to work at something else, we partially destroy the results of our previous learning "Even looking through a book of commonplace pictures is said to lessen the effect of any preceding memory work "[6]

Anything which makes the process of learning intense and impressive is to be welcomed as an aid.[7] Learning

[1] Myers, *Text Book of Experimental Psychology*, p 173

[2] Rusk, *Introduction to Experimental Education* p. 183.

[3] Ballard Paper on "Reminiscence," read before the British Psychology Society, Nov 1912.

[4] See *Journal of Educational Psychology*, June 1913.

[5] James *Principles of Psychology* Vol. I, p. 110.

[6] Watt, *The Economy and Training of Memory*, p 67

[7] See especially Culverwell's article on "The Creation of a Memory," *Journal of Experimental Pedagogy*, Nov 1911 pp. 160 f.

Most of us find poetry easier to learn than prose The reason, in addition to such minor aids as alliteration and rhyme, is the presence of a marked *rhythm* Work of *all* kinds proceeds more effectively when some rhythm can be introduced into it. And where the object is merely that of memorising, the teacher should encourage the children to fall into a "swing"

We have seen that *habits* are also forms of association. In them, *movements* are the more prominent features. But ideas are also connected with the movements. We sometimes, indeed, speak of habits of *thought* It is, in fact, extremely difficult to separate habits from other associations. A boy who has learned his multiplication table may quite well be said to have acquired the *habit* of saying it.

Much, therefore, that has been said with respect to learning by heart applies also to the formation of habits Space will not permit any extended treatment of this matter But it is well to emphasise the need (1) of grounding the habits on some of the tendencies or conations of the individual (*i e.* getting him *interested* in the formation of the habits), and (2) of avoiding any lapses, *especially* in *the early stages* (since *early associations* are so strong and difficult to eradicate).

We have seen that memory in almost all cases implies the formation of associations between definite elements. There is thus not *one* memory, but *many* memories. The use of the one word *memory* tends to disguise this fact, and to cause us to think of memory as some special and particular power which we possess. In the past this error has been frequently made And it is responsible for many educational blunders. Memory has been looked upon as

an organ or limb of the mind, as the arm is a member of the body. Just as we can make the arm stronger by any *one* of a given number of exercises (rowing, or punching, or hammering) so that it will be stronger in future *for all the others*, so it was thought that we can make the memory stronger for *all* purposes by exercise in any *one* field. The only question to be solved was which field gave the greatest improvement. Some said classics; Herbert Spencer said science And the same doctrine has been extended to cover all kinds of mental activity. It has been held that the reasoning involved in one subject (say arithmetic) will cause an improvement in reasoning *all round* (*e g.* in science, grammar, and literature), that the habits formed in school work will spread to all other work, whether in or out of school. This doctrine has been called *The Doctrine of Formal Training*. Perhaps a better name would be *The Doctrine of the Spread of Training*.

The doctrine in question has been used to justify the classical training given in the great secondary schools. In the Middle Ages this training had a direct utility, since all the important books were written in Latin or Greek. But now that a classical training is not of direct use, it is sought to justify it on the grounds that from it an influence of a peculiarly beneficial kind spreads to all other important branches of life, especially of the higher types of business, professional, and administrative life, to which the sons of the upper classes so easily find access. To justify it further, supporters of the system have told us that practically all the great soldiers, sailors, and statesmen of the past went through this training. But they omit to point out that the higher posts have always been filled almost exclusively from these classical schools. Their argument therefore is in no way conclusive as to whether these great

Most of us find poetry easier to learn than prose The reason in addition to such minor aids as alliteration and rhyme is the presence of a marked *rhythm* Work of *all* kinds proceeds more effectively when some rhythm can be introduced into it And where the object is merely that of memorising, *the teacher should encourage the children* to fall into a "swing"

We have seen that *habits* are also forms of association In them, *movements* are the more prominent features But ideas are also connected with the movements We sometimes, indeed, speak of habits of *thought* It is, in fact, extremely difficult to separate habits from other associations A boy who has learned his multiplication table may quite well be said to have acquired the *habit* of saying it

Much, therefore, that has been said with respect to learning by heart applies also to the formation of habits Space will not permit any extended treatment of this matter But it is well to emphasise the need (1) of grounding the habits on some of the tendencies or conations of the individual (*i e* getting him *interested* in the formation of the habits), and (2) of avoiding any lapses, especially in the early stages (since early associations are so strong and difficult to eradicate)

We have seen that memory in almost all cases implies the formation of associations between definite elements There is thus not *one* memory, but *many* memories The use of the one word *memory* tends to disguise this fact, and to cause us to think of memory as some special and particular power which we possess In the past this error has been frequently made And it is responsible for many educational blunders Memory has been looked upon as

an organ or limb of the mind, as the arm is a member of the body. Just as we can make the arm stronger by any *one* of a given number of exercises (rowing, or punching, or hammering) so that it will be stronger in future *for all the others*, so it was thought that we can make the memory stronger for *all* purposes by exercise in any *one* field. The only question to be solved was which field gave the greatest improvement. Some said classics; Herbert Spencer said science And the same doctrine has been extended to cover all kinds of mental activity. It has been held that the reasoning involved in one subject (say arithmetic) will cause an improvement in reasoning *all round* (*e g.* in science, grammar, and literature), that the habits formed in school work will spread to all other work, whether in or out of school. This doctrine has been called *The Doctrine of Formal Training*. Perhaps a better name would be *The Doctrine of the Spread of Training*.

The doctrine in question has been used to justify the classical training given in the great secondary schools. In the Middle Ages this training had a direct utility, since all the important books were written in Latin or Greek. But now that a classical training is not of direct use, it is sought to justify it on the grounds that from it an influence of a peculiarly beneficial kind spreads to all other important branches of life, especially of the higher types of business, professional, and administrative life, to which the sons of the upper classes so easily find access. To justify it further, supporters of the system have told us that practically all the great soldiers, sailors, and statesmen of the past went through this training. But they omit to point out that the higher posts have always been filled almost exclusively from these classical schools. Their argument therefore is in no way conclusive as to whether these great

ever learns to do one thing by doing something else, *however closely allied the things may be.*"[1] But surely a person who has learned to play on the organ has thereby acquired *some* facility to play on the piano. All the experiment and criticism which has been brought to bear on this matter seems, indeed, not to have destroyed the doctrine, but rather to have defined and limited it. There *is* "spread" from one subject to another in so far as there are any common elements or features.

Further, it is to be remembered that there are elements which can be made to permeate the whole of life—*ideals*, *purposes*, *aspirations*, or *ambitions*.[2] Moral instruction and training, for instance, whether undertaken at specific times or only incidentally in connection with various lessons, is not given with a view to excellence in one particular branch of activity; we want it to have an effect on the whole of life. It is true that such a habit as that of neatness may develop within a certain subject (*e.g.* arithmetic) and show no signs of spreading to other subjects (*e.g.* written composition). But if the mere habit is based upon an ideal ("Whatever is worth doing is worth doing well"), consciously accepted by the individual concerned, it *will* tend to spread to other subjects.

We may, therefore, continue to speak of Formal Training so long as we clearly recognise its limitations.

Questions on Chapter X.

1. Describe as clearly as you can the mental process which takes place in *recognition*. What is the difference between *recognition* and *apperception*?

2. How is it that the mind wanders to all kinds of ideas in *reverie*, but sticks largely to the point in *description*?

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[1] *The Perfect Wagnerite*; italics ours. [2] See p. 119.

3 *Répétez sans cesse* Is this recommendation to be blindly followed in school? Give reasons for your answer

4 Why do we remember stories which interest us deeply better than those which do not?

5. Explain what is meant by *perseveration*. To what extent can it be relied upon by itself to ensure the reproduction of things learned in school?

6 What reasons can you give for a good habit breaking down after a boy leaves school?

7 What do you understand by the *Doctrine of Formal Training*? Criticise it.

CHAPTER XI.

BACKWARD AND PRECOCIOUS CHILDREN AND THE MEANS OF DEALING WITH THEM.

Some children—happily a small proportion[1]—are mentally deficient. They cannot profit to any appreciable extent from the instruction given in the ordinary schools. These children are now provided for in special schools, and the ordinary teacher has no longer to concern himself with them. But there remains among the children attending the ordinary schools a comparatively large proportion of backward children. And it has been pointed out that these deserve—what they have not in most cases obtained—even more attention than the mentally deficient. For, on the one hand, they are much more numerous,[2] and on the other, *they will repay far more than the mentally deficient for the care bestowed on them.* Thus Professor J. A. Green writes as follows:—

"Whilst a great deal of energy is being misspent in wrongly directed effort to educate mentally deficient children whose social value must in the great majority of cases be something less than zero, we have been in this

[1] Galton gives the proportion as ·27 per cent.

[2] Galton gave the proportion as 7·72 per cent. Dr. Kerr, the chief of the Schools' Medical Officers of the London County Council, in his report for the year ending March 31st, 1906, gave it as 12 per cent.

country content to let the problem of the backward child remain with the struggling teacher, who can, in general, do nothing more for him than insist upon his repeating the meaningless grind at which he has previously failed."[1]

The necessity of dealing more effectively with these backward children becomes all the more obvious when it is shown that of short-time prisoners in our gaols a very *large proportion*[2] *have been among the backward at school.* If this is true, we are not only failing by our lack of special attention to backward children to get some return for our educative work, but we are saddling society with a positive burden

One of the most striking results of observation of backward children is that a large number of them have some physical defect. Thus Dr Warner writes —

"Taking 100 dull boys and 100 dull girls, we find —

"Among children seven years and under 45 boys, 55 girls have developmental defects, 49 boys, 44 girls have nerve signs, 23 boys and 30 girls are delicate. Note the large proportion of young girls that are also delicate

"Among children eight or ten years old 43 boys, 42 girls have developmental defects, 63 boys, 56 girls show nerve signs; 14 boys and 16 girls are delicate.

'Among children eleven years and over 38 boys, 35 girls have developmental defects, 59 boys, 56 girls present nerve signs, and 7 boys and 10 girls are delicate"[3]

[1] "Note on Backward Children' in *The Journal of Experimental Pedagogy*, Nov 1911, p. 158

[2] Professor Green, after making allowance for the mentally deficient and for those who have greatly deteriorated after leaving school, obtains a proportion of at least 60 per cent. (*The Journal of Experimental Pedagogy*, March 1912, p 224)

[3] Warner, *The Study of Children*, pp. 163 4.

But, in addition to physical defects which are open to observation, there may be many more which are due to past occurrences but which have left no obvious external mark on the child. Only an investigation into the past history of the child could bring these to light. This was undertaken in the case of the backward pupils of the Manchester Grammar School by the School Medical Officer. And the Headmaster reports: "There are some cases in which there has been grave illness before the age of four: serious infection like scarlet fever, croup, bronchitis, typhoid, pneumonia. These, so far as our experience goes, seem to inflict an injury on the brain which is more or less permanent. After that, from five to twelve, there is also an onset of disease which interferes very considerably with intellectual progress. It not only damages the brain, but it also involves a great deal of absence from school, and in those cases where the school attendance has been broken into you get a backward pupil who has a deficiency in acquirement and very frequently a difficulty in memorising."[1]

Another physical cause of backwardness which is sometimes overlooked is poor feeding. "You will be sometimes told that the brain is the last organ in the body to suffer from deprivation of food. Do not believe that. My own conviction is that it is the first to suffer. It may under starvation retain its plump contour, and show less wasting than other organs, but what of its delicate machinery within? Every brain worker must know the dulling effect of the want of regular meals. And in children any insufficiency of nourishment is promptly reflected in a curtailment of their learning capacity. . . . Parents must

[1] J. L. Paton, Address on "The Problem of the Backward Child," *Report of Proceedings, L.C.C. Conference of Teachers*, 1912, p. 36.

by no means be relieved of their parental responsibilities, but all children must somehow be supplied, not occasionally, but always and systematically, with a sufficient amount of food if we are to better the condition of our people "[1]

Probably, if we could know all about each case of backwardness, we should find that in every instance mental weakness is correlated with physical defect of some kind Wherever possible, therefore, we should do what we can to remove the physical defect. Feeding of poor children has already begun And medical inspection is also in process of development It is to be feared that many *children in the past have been hopelessly consigned to the* abyss of backwardness when a little observation of their physical characteristics would have revealed a cause which could to some extent have been dealt with Not a few cases have been noted in which children partially deaf or short-sighted have remained "stupid" for years, when the discovery of the cause could have led either to its partial removal or to simple arrangements whereby its consequences might have been mitigated

The fact remains, however, that in many cases the evil has already been done Sometimes, indeed, it has not been during the lifetime of the child "Joseph Cook quotes Oliver Wendell Holmes as saying, in response to the declaration that any disease may be cured if a physician is called early enough, that the statement is *true, 'but early enough would usually mean two hundred years in advance'"*[2] Though, *therefore, we may diminish* the amount of backwardness in the future by more careful attention to the physical side of the children's lives, we

[1] Sir James Crichton Browne, Chairman's Address on "The Treatment of Backward Children at the L.C.C. Conference of Teachers, 1912.

[2] Taylor, *The Study of the Child*, p 184.

can never hope to remove it entirely, and the problem of the backward child will continue to confront us.

The most obvious thing to do with the backward child is to keep him back when the other children are promoted. This is the course which has most frequently been followed. But it has serious disadvantages. In the first place, it leads to an accumulation of dull children in the lower classes of the school. And these have a depressing effect on the other children and on the teachers, both of whom could get on more smoothly and rapidly without them. In the second place, it is partially wasteful for the backward children. For, in spite of their failure to assimilate much of the instruction, there are still many things which either do not need or will not bear repetition. The same songs, the same drawing exercises, the same stories, the same reading books, the same writing tasks are not calculated to inspire the interest which is so pre-eminently necessary in the case of dull children. Often they are distinctly good, sometimes, indeed, considerably above the average, in some parts of the curriculum. To grind over these again must therefore be a soul-deadening task in many cases.

But perhaps the most baleful effect of such a plan is the loss of self-respect which an older boy usually suffers when he finds himself condemned to take a position among other boys much younger than himself. "In the treatment of backward children we need above all things to cherish self-respect, to find out what a lad can do, and give him opportunities for excelling in it."[1]

In the German city of Mannheim, and in some other continental cities, special schools, each consisting of a series of classes for backward children, known as the

[1] Green, *op. cit.*, p. 226.

"coaching' or intermediate (Forderklassen system) series have been established 'In these (classes) the maximum number of children is thirty five so that greater individual attention can be given The curriculum is practically a repetition of the work done in the main series from which these repeaters or the backward children have been drafted At the end of the year the child may have so far improved as to be able to pass back to the main series of classes or he may be transferred to the next higher grade of the intermediate classes In any case he will have lost a year, so that supposing his progress continues to be normal at the time he reaches the age of fourteen he will only be in grade 7 of the intermediate series Hence there are only seven grades in the latter series (whereas there are eight in the main series) About 10 per cent. of the children belong to the Forderklassen'[1]

This Mannheim system, though it appears to be doing good work has serious disadvantages If ill health or irregularity has been the reason for degrading a pupil he usually makes up leeway and is restored to the main system But a really backward child tends to remain in the intermediate series There seems however, to be little adaptation of the curriculum to the special needs of such children We shall see for instance that a large amount of manual work is good for these children. Another strong objection to this type of school is that the backward children are segregated in institutions whose general character is well known, and which are often called by such names as 'Fool Schools,' "Silly Schools' or some such offensive title. But, as we have already noted, it is most important with backward children to preserve self respect. Further,

[1] Dr George Auden The Mannheim Method of Treating Backward Children" *Report of Proceedings, L.C.C Conference of Teachers*, 1912.

a child who has remained through the whole course of such a school acquires habits of reacting to companions of the same type only as himself. When, therefore, he goes forth into the world, he finds himself at a loss, and largely unable to meet the demands of ordinary community life. It must be remembered that a child often learns as much from his fellows as from his teacher. And while little if any intellectual harm is done to the normal children by allowing the few backward ones to mix in their games and other recreative occupations, a great deal of good accrues to the latter by virtue of such opportunities.

In America, therefore, a different system has been adopted. Instead of having a separate school to supply a large district, what is called an Ungraded Class is formed within some ordinary school in every small district in which it is required. "No attempt is made to permanently segregate the aments in special schools, and in every way possible competition with normal children during recesses, in games, etc., is encouraged, in order that the ament may in a measure mature in the midst of the community in which he must later live."[1]

Perhaps the most important difference between the American system and the German is that in the former the attempt is not made to feed the backward children on the same intellectual pabulum as is found suitable for the normal children. The backward child is usually inferior to the normal child in sensory discrimination, and responds much more feebly to the stimuli of the outer world. In other words, his perceptions are much more imperfect; and since perception is the foundation of all further intellectual progress, everything possible must be done to improve its

[1] "The Subnormal Child in New York City Schools," by Mary Sutton Macy, M.D., *The Journal of Educational Psychology*, Vol. I., p. 134.

efficiency "In this case the teacher must first awaken the sensory mechanisms, or teach the child to feel, taste, smell, hear, and see For this purpose the teachers of the Ungraded Classes use the kindergarten methods of sense *training, but use them to a degree which would be over* use for a normal child."[1] Above all, the self activity of the child must be aroused, and this is done by finding out the things which he is interested in doing, and selecting from among these those things which can be made educationally profitable.

This is precisely what Madame Montessori did in Rome in the case of the feeble-minded, with whom she was so successful that they were able to equal the normal children in tests of intelligence And though her system may have to be considerably modified when applied, as she is applying it, to normal children, there is little doubt that some *of its essentials infused into our ordinary* curriculum would do a large amount of good If, then, this system as a whole is excellent for the feeble minded, and to a certain extent necessary for the normal children, it follows that a large portion of its principles, if not of its details of method should be adopted with those who are neither intelligent enough to be called normal nor stupid enough to be classed as *feeble minded*

It is obvious that this fitting of the work to the needs of the individual child cannot be done with large classes Accordingly the size of each Ungraded Class in America is limited to fifteen in average attendance

As in Germany, the Ungraded Classes are considered as special coaching classes and some of the children are returned or promoted to the ordinary grades

To sum up, the activities of the children are co ordinated

[1] *Op. cit.*, p. 142.

and developed: "(1) by games and exercises to music—for the ament, strange to say, is fond of music and usually possesses an innate and fairly accurate sense of rhythm; (2) by simple folk dances and gymnastic drills; and (3) by manual work, with a large share of emphasis placed upon the particular form of manual training for which each child shows an aptitude or preference." [1]

Similar classes have been formed in some English schools. Thus in 1909 a class known as a "practical" class was formed in Brighton under the superintendence of Dr. Duncan Forbes at Richmond Street School. Some of the remarks made upon it are extremely interesting, as they emphasise still more strongly what should be the general nature of the work and organisation. The following extracts are taken from Dr. Forbes' report upon the class.[2]

"The aim of Mr. Mulrenan, the headmaster, is 'to make the curriculum fit each boy.' Unfortunately, although classed together, the individual boys differ widely from each other in capacity in any one subject, so that much individual attention is required.

"The class joins with the others at prayers, opening and closing of school sessions, scripture and play. They interchange rooms with other classes for reading, writing, and drawing, etc.; at those times their classroom is available for the teaching of manual work to classes from the school proper. This makes the carrying out of this work economical.

"*Method of teaching.*—This has been elaborated by Mr. Mulrenan, the headmaster, to whom the success of the class is almost entirely due. All things are taught in

[1] *Ibid.* [2] "An Experiment in the Treatment of Backward Children," Dr. Duncan Forbes, *Report of Proceedings, L.C.C. Conference of Teachers*, 1912.

a practical manner For instance, when the class started, *only two boys could* read the time from a clock (though the average age was $12\frac{1}{12}$) The boys were set to make dials, *to put on figures and hands, and now each boy in* the class with one exception can tell the time

"Similarly, with weights and measures, the boys actually measure objects, they weigh out quantities, they make out headed bills for small amounts of well known food stuffs, and handle the money supposed to be paid When history is taught, they make models of the various things mentioned"[1]

Work of the same kind, though on a somewhat higher plane, was provided for the backward boys of the Manchester Grammar School by Mr J L Paton, the High Master Thus he tells us "They rise very readily to the idea of making the properties for the school play—the throne, settee, balcony, the spears, and shields, and so forth—and we get here a beautiful correlation between art and handicraft. They will rise to making their early physics apparatus They will do their levers and pulleys and their wheel and axle and work them out in a practical way, just as they will work out their kite of Pythagoras in wood for the mathematical master"[2]

In short, these backward children are catered for by providing for them much more of that handwork which has already been found essential for normal children This additional handwork involves the neglect of some parts of the usual subjects taught And the parts neglected are the more abstract ones, such as the more complex operations in arithmetic, grammar, the theory of music and so forth

But the additional handwork provided must be such as

[1] *Op cit*, pp. 41 2. [2] J L. Paton, *op. cit*, p. 37

interests each individual. Further, it must not be a mere isolated occupation, but a real part of the boy's curriculum, more or less connected with the other lessons, and involving definite intellectual progress. "Unless the workshop becomes the laboratory for the class-room, it simply remains a joiner's shop, and has no more education in it than a joiner's shop."[1]

Such are the best things that have up to the present been done for backward children. But these classes cannot be formed in all schools. For instance, small schools in outlying districts would not have sufficient backward children to warrant the formation of a class. What then is to be done? The answer is simple. We must try to do as much as possible of the same kind of thing for the backward children *within each class.* We must allow these children to drop out of certain subjects in which they cannot keep pace with the rest, and to do further handwork on lines which interest them. In this way, they will recover their self-respect; they will find that there is something that they can do well; and they will become happy and tractable members of the school community. Further, the pleasure which they derive from their successful activity will stimulate them to heightened activity. (See p. 43.) It has been found that backward children show a great improvement in energy and brightness when put on to manual work of a kind which appeals to them. And when they are engrossed in this work, the teacher will have little trouble with them; he will thus be able to devote most of his time to the more numerous normal children.

While we find mentally deficient and backward children at the lower end of the scale of intelligence, we are com-

[1] *Ibid.*

pensated at the upper end by precocious children and geniuses

True geniuses are so rare that we need not concern ourselves with the problem of making special arrangements for them But the number of "supernormal" children is comparatively great Little, however, has been done up to the present in the way of giving special attention to their education

At the outset, it is necessary to distinguish two broad classes of "supernormals" We have those who display remarkable ability in only one branch, *e g* in music, in art, in mathematics, or in literature Extreme cases of these are often spoken of as "infant prodigies" But we have also those who, without displaying transcendent ability in any one subject, are very intelligent indeed in almost all branches These, if their early promise is fulfilled by continued development, will, under favourable conditions, become the really great intellects

"Infant prodigies" are often merely cases of very rapid development which comes to maturity early and hence produces no very remarkable result But, even when a better fate might await them, they are often spoilt by being dragged before the public eye, by the pampering and one sided development which they obtain, and by the injury to body and mind which is a necessary consequence of the artificial life they are constrained to follow

Some of those who are highly gifted in one special branch are fortunate enough to have parents or patrons who take them in hand and wisely arrange a special course of education in which their whole nature is developed as harmoniously as possible, while their special gift is at the same time cultivated by the instruction and guidance of expert teachers

But this is at present largely a matter of chance For

one individual who attains distinction and who benefits the community by his talent in this way, there may be, among the millions of children in our primary schools, some hundreds whose talent is never appreciated, and who are forced into the same routine as that of the normal children.

> "Full many a gem of purest ray serene
> The dark unfathomed caves of ocean bear:
> Full many a flower is born to blush unseen,
> And waste its sweetness on the desert air."

"A single illustration of this fact: A few years ago a prominent educator in Munich, Kerschensteiner, undertook his well known experiments upon some 50,000 children of the public schools of that city. In these experiments the pupils had to make free-hand drawings of specified objects, both from memory and from nature. Among the drawings were found some of remarkable artistic merit, and these were found by Kerschensteiner to be, almost all, the work of children of very poor parents. Moreover, in most cases, this exceptional talent in drawing had not been properly appraised by the school, and in some cases it had not even been noticed at all. Kerschensteiner saw to it that these children were assigned to art schools or to arts and crafts schools, where they found an opportunity to develop and realise their special gifts. But what would have become of these children had not Kerschensteiner chanced to make his experiment? And how much similar talent may smoulder unrecognised in other places where no one thinks of making such tests? And should we not expect similar discoveries of talent to result in any other place where like tests were made?"[1]

[1] Dr. William Stern, "The Supernormal Child," *The Journal of Educational Psychology*, Vol. II., pp. 146-7.

What Kerschensteiner did for these children of Munich should be done for the specifically endowed of all other cities Where, however, they are sent to special schools, care should be taken that their general development is not sacrificed Thus in a special school of art for such children arrangements should be made for some instruction in literature, in science, in geography, in history, and in arithmetic

But it may not be necessary in many cases to segregate such children completely from their fellows It may be possible *to arrange special ' talent classes,"* which *the* pupils attend for advanced instruction in the particular subject, while for the remainder of their education they work with the normal children *It is hardly necessary to add* that the same arrangements could be made, *mutatis mutandis* in the case of other talents beside the one mentioned, *e g* for pupils of exceptional ability in music, in language, in mathematics

While awaiting such developments of education, it is every teacher s duty to be on the alert for exceptional ability in his pupils in any of the branches of the curriculum. And when he has found it, he should do all in his power to foster it In the lessons on the subject in question, the pupil might be allowed special opportunities of developing his talent This will be within somewhat narrow limits while he remains in the same class with the " normals In some subjects a brilliant boy can be allowed *to assist in the teaching rather than act as a pupil* *Thus* a boy who is a fine musician might accompany the songs on the piano or violin, and even conduct the class from time to time, if his ability runs in the direction of singing, he might also sing many solos, and very often he could be called upon to give the class a model for the rendering of a difficult passage. In drawing, somewhat similar use

could be made of the talented boy. So, also, in other forms of manual work. And even in arithmetic, a good deal could be done in the way of getting the smart boys to supervise and assist the duller boys.

But it is important that any arrangements of this kind should not develop into a systematic attempt merely to exploit the talent of such boys. The first thought in the teacher's mind should be the progress of the boy, not the use to be made of him. In schools where the time-table for the subject in question is synchronous, it would be possible to place the brilliant boy of a lower class into an upper one for this part of his instructions. Where, however, this is not possible, or where the boy has outstripped even the oldest of the normal boys, he might be allowed to work on by himself. And if one of the staff is specially qualified in the subject, that teacher might be asked to give him some assistance.

The great differences which are being noticed as the result of more careful observation, even among what are called "normal" boys, are leading some educationists to advocate far more attention to individuals and far less collective work, in which all go at much the same pace, than has been the case in most modern schools during recent years. Although it is impossible for the teacher to carry this change very far with his numerous pupils of the normal type, he should nevertheless regard it as an essential part of his duty to devote as much of his time as possible to the encouragement and development of special talent in particular branches.

We come lastly to the case of those boys who are distinctly above the average in almost all of the work. Until quite recently, with promotions occurring no more frequently than the end of each school year, no special arrangements

were made for these boys To a large extent they "marked time." The work of the normal boys presented no difficulties to them. There was little to grip their attention. Bored to death, they were frequently a nuisance to the teacher instead of a source of satisfaction. Here, then, was the most valuable product of human progress wasting and spoiling for lack of proper instruction.

With the terminal and half-yearly promotions of recent times, these boys can pass up more quickly into a more profitable intellectual environment. And the system of scholarships by which they can rise rapidly from the elementary school to the secondary school forms an incentive as well as a means for higher endeavour.

But this system has its disadvantages. Although these specially gifted boys are promoted frequently, they work during the intervals between their promotions with normal boys. And although they are well extended in some of the subjects, in others they could easily go much faster. Further, it is to be borne in mind that, although a boy of great gifts may be more than the intellectual equal of normal boys who are much older than himself, *he is not their equal in other matters* He is, of necessity, smaller than they. And there is a certain general ascendency, largely dependent on age and size, which contributes to place such a gifted boy at an obvious disadvantage. Intellectually he is superior. But socially he has to take a position of inferiority. And this is likely to be harmful to the development of his character in strength and independence.

It has, therefore, been proposed by some educationists to establish select classes for these exceptional boys. These have been called by Dr. Stern "élite classes," and he writes of them as follows.

"Into the élite classes should be transferred only those

pupils who were surely gifted with superior *general intelligence* (not those who have only some special gift); moreover, the supernormality, to justify enrolment, must be of an extraordinarily high degree, so that these classes should represent the strictest selection." [1]

These classes would not, of course, be very numerous, and they would not be formed for very young children, since it would take some years for a child to show sufficient superiority to warrant selection. One writer, for instance, proposes that in the secondary schools of Berlin not more than 20 of the most gifted pupils of the *Quinta* (age 10-11) should be selected each year, these being formed into an élite-class which would continue the work more rapidly and more thoroughly than is possible in the ordinary secondary school. From the elementary schools, however, a larger number of pupils could be selected. For among so great a body of children, many more (though, *in proportion to the whole*, much fewer) especially gifted ones would be discovered.

Precautions would have to be taken against the development of intellectual arrogance among such children. The classes would not be publicly called élite-classes, and continuance in them would depend on perseverance and strength of character.

Much attention would be necessary to the health of such children. In particular it would be important to guard against the dangers of over-working.

The method of selection for these classes would require very careful attention. Examinations which test mere knowledge would not be sufficient. Mental tests [2] would

[1] Stern, *op. cit.*, p. 183.

[2] Mental tests are attempts to gauge the ability which a person possesses independently of any special training or teaching. Thus to test the rapidity of reading of six-year-old children from different

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But this system has its disadvantages Although these specially gifted boys are promoted frequently, they work *during the intervals between their promotions with normal* boys And although they are well extended in some of the subjects in others they could easily go much faster Further it is to be borne in mind that, although a boy of great gifts may be more than the intellectual equal of normal boys who are much older than himself, *he is not their equal in other matters* He is of necessity, smaller than they And there is a certain general ascendency largely dependent on age and size which contributes to place such a *gifted boy at an obvious disadvantage* Intellectually he is superior But socially he has to take a position of inferiority And this is likely to be harmful to the development of his character in strength and independence

It has therefore been proposed by some educationists to establish select classes for these exceptional boys These have been called by Dr Stern elite classes and he writes of them as follows

Into the elite classes should be transferred only those

pupils who were surely gifted with superior *general intelligence* (not those who have only some special gift); moreover, the supernormality, to justify enrolment, must be of an extraordinarily high degree, so that these classes should represent the strictest selection." [1]

These classes would not, of course, be very numerous, and they would not be formed for very young children, since it would take some years for a child to show sufficient superiority to warrant selection. One writer, for instance, proposes that in the secondary schools of Berlin not more than 20 of the most gifted pupils of the *Quinta* (age 10-11) should be selected each year, these being formed into an élite-class which would continue the work more rapidly and more thoroughly than is possible in the ordinary secondary school. From the elementary schools, however, a larger number of pupils could be selected. For among so great a body of children, many more (though, *in proportion to the whole*, much fewer) especially gifted ones would be discovered.

Precautions would have to be taken against the development of intellectual arrogance among such children. The classes would not be publicly called élite-classes, and continuance in them would depend on perseverance and strength of character.

Much attention would be necessary to the health of such children. In particular it would be important to guard against the dangers of over-working.

The method of selection for these classes would require very careful attention. Examinations which test mere knowledge would not be sufficient. Mental tests [2] would

[1] Stern, *op. cit.*, p. 183.

[2] Mental tests are attempts to gauge the ability which a person possesses independently of any special training or teaching. Thus to test the rapidity of reading of six-year-old children from different

have to be elaborated Such tests have already been devised by the French psychologist Binet, and improved upon by others They have been tried upon a considerable number of children of different ages But they are by no means completely satisfactory at present With further progress in this matter, particularly in the direction of *framing tests to distinguish the specially gifted, it should soon be possible to make reliable selections of supernormal* children.

"If suitable teachers are found for such classes and schools, and if they are not made too large, their achievements may be quite extraordinary By following a very different pace from the ordinary classes, by broadening and deepening the culture material, by minimizing drill and mechanical aids to memorization, by cultivating especially the habit of independent mental review and assimilation of the subject-matter and by free election within the subjects of instruction (*particularly in the upper classes*), *the superior capacities of these pupils* would be given the possibility of development for which their birth had fitted them, moreover, by reason of the quite unusual demands made upon them, self discipline and the spirit of

families and schools would *not* give an indication of such ability For some children are not encouraged *to learn reading before the age of six*, whereas others are. But to test them by asking each to repeat a sentence of sixteen syllables after one hearing of it *would* give some indication For all normal children of the age in question have heard and repeated a large amount of language. *If a* number of different tests, each as far as possible independent of any special training which some of the children may have undergone, be thus applied it is possible to form fairly reliable conclusions as to the ability of each child. (*For a revised list of Binet's tests see* article on "The Measurement of Intelligence," by Miss K. L. Johnson, in *The Journal of Experimental Pedagogy*, Nov 1st, 1911, pp. 143 ff.)

conscientiousness would also be developed in a manner totally impossible for such pupils in the ordinary school. And there would be developed for society a class of leaders equipped with really deeper and broader training."[1]

Thus would Plato's dream of a class of "perfect guardians" be realised. The "golden" minds would be distinguished from those of "copper" and "iron," and would receive all the refinement of which they are capable. No longer would a child's destiny be decided chiefly by the birth or position of its parents. For even the rulers themselves would have to obey this law—viz. that "if a child be born in their class of copper or iron, they are to have no manner of pity upon it, but giving it the value that belongs to its nature, they are to thrust it away into the class of artisans or agriculturists. . . ."[2]

This may to some appear inhuman. But in reality it is the greatest kindness. For what can a parent do better for his son than to see that he has the education most suitable for him, and then that he enters the trade or profession in which he can do the best work? "The greatest folly which parents can commit is to force their children into callings for which they have no aptitude. It is a step that can seldom be retraced with safety or advantage. A mistake may destroy the health of the mind, and tranquillity of the heart."[3]

[1] Stern, *ibid.*

[2] *Republic*, Book III. Instead of using the phrase, "no manner of pity upon it," Plato might have said, "no unjust preference for it." And in place of the phrase, "to thrust it away into," he might have said, "to put it in its proper place among."

[3] Quoted in the *Daily Chronicle* (January 13th, 1912) from a lecture by Dr. Bernard Hollander, on "The Physical and Mental Conditions necessary to Success."

Questions on Chapter XI.

1. What do you understand by the terms *mentally deficient*, *backward*, *normal*, and *supernormal* children?

2. What observations and inquiries would you make before considering a child as hopelessly backward?

3. Supposing that it is impossible to transfer a backward child from your class to one more suitable, how would you deal with him?

4. Why is it important, even when backward children are taught in a separate class, to allow them to mix with the normal children in play and recreation?

5. Sketch briefly and in general outline the curriculum suitable for a class of backward children.

6. Distinguish two types of supernormal children.

7. How would you deal with a boy who is highly gifted in drawing, but who, for circumstances beyond your control, has to remain in your class for all subjects?

CHAPTER XII.

THE "NEW" PSYCHOLOGY.

In many parts of this book, reference has been made to the fact that, although minds are similar and develop largely on a common plan, no two are exactly alike.[1] Children differ mentally as they differ in external appearance. Both with regard to innate characteristics and in the matter of environment, with all its effects on character, knowledge and skill, there is ubiquitous variation. In other words, nature and nurture are never precisely the same in any two cases.

In our first chapter, it was stated that "in such a book as this, it is possible to deal only with the points of similarity,"[2] and throughout the body of the book, this stipulation has been consistently, though not too rigidly, observed. But in the preceding chapter, it was definitely removed, an attempt being made to start the student on the road to that consideration of individual characteristics, their causes and treatment, without which no teacher can do his best work.

It now becomes necessary to add a further chapter on this subject of individual differences. The need of studying the special characteristics of each child, and of modifying educative treatment in accordance with those distinguishing

[1] See, for instance, pp 8-9 and 40. [2] p. 8.

features is becoming more and more pressing as the years roll on

Many reasons may be assigned for this change We will content ourselves with those which appear to be the most important The nineteenth century witnessed the establishment of school education for all children—poor as well as rich Funds however were limited and the number of even fairly qualified *teachers was extremely* inadequate Children had therefore to be taught in large classes The accompanying illustration gives some idea of mass instruction The system gave rise to a special technique according to which children were dealt with *rather as soldiers in a regiment than as human beings* with widely differing temperaments aspirations and capacities There was no time for careful consideration of individuals as such Although of course children were known to vary very greatly they could be taught only on the basis of what their minds had in common The only effective subdivision of the pupils in a class was into probable *passes* and *failures* at the annual examination This indiscriminate treatment in elementary schools persisted largely unchanged up to the end of the last century [1] *And even at the present time much of the old* regime still holds its ground

What wonder then that until quite recently the theory *of school* education both in the matter of child mind and in that of method and organisation concerned itself chiefly with those points of likeness among scholars which render it possible to deal with them in the mass

But the difficulties and disadvantages of this mass instruction gradually became so evident that a revolt

[1] The writer at the age of *18 though still untrained was responsible* for a class of 81 boys in Standard I

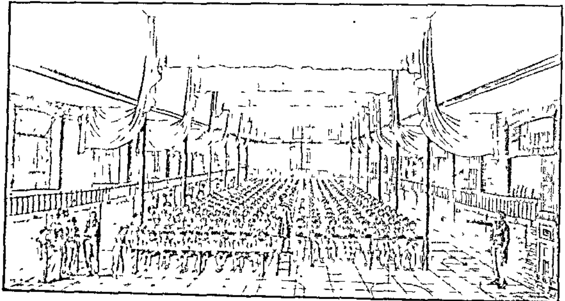


Fig. 14.—The School at the Borough Road, arranged according to the Lancasterian Plan.

To face p. 204.

occurred in favour of more individual methods of treatment, with the consequent necessity of greater attention to the special characteristics of each pupil.

A powerful contributory cause of this development has been the change in the conditions of life in civilised society. Schools exist to prepare children for life; and changes in the latter must sooner or later give rise to modifications of school work. The continued development of specialisation in industry, commerce and the professions, combined with the requirement of higher standards of efficiency in these occupations, has made it more and more necessary to discover and to foster the individual aptitudes of our pupils.

At the same time, psychology itself has developed—more or less independently—in much the same direction. During the nineteenth century, various attempts at experimental work were made—first in Germany, and later in America, England, France, and other countries—the object being to make psychology an exact science, based on experiment and mathematical calculation. At the outset of this movement, psychology was still conceived as concerning itself with mind in general. "Differences between one mind and another it ignored. . . . At length, however, attention came to be focussed directly on these differentiating qualities, in and for themselves. Their origin was investigated; and their variations with varying age, sex, race, heredity and environment were themselves discovered to be rich in interest. And thus at last an independent branch of mental science, 'differential' or 'individual psychology,' was founded and named."[1]

This attempt to "size-up" individuals has opened the

[1] *Psychological Tests of Educable Capacity*, Board of Education, p. 2.

door to a new type of psychologist Some, indeed, would hesitate to call him a psychologist Instead of endeavouring to examine the minds of his "subjects"[1] by interpretative exploration enlightened by introspection, the "new" psychologist stands outside and applies more or less ingenious tests The results obtained are often subjected to mathematical treatment, from which various conclusions are deduced as to the capacity of the subjects tested

These tests are usually referred to as *psychological* or *mental tests* They have concerned themselves chiefly with the *cognitive* side of mind It is obvious, indeed, that direct measuring of *conation* or of *emotion* is extremely hazardous And combinations into which these enter are still more difficult of measurement. Who, for example, shall claim to be able to measure *character?* Only the acid test of life itself can adequately reveal this all important fundamental In spite of laudable attempts at special testing in this field, it remains tolerably clear that "tests of temperament and character, in their present state of development, are practically useless to teachers for the purpose of affording trustworthy information on such aspects of temperament and character as bear directly on educable capacity"[2]

But character is the supreme factor in mental affairs and this consideration has led some to belittle the importance even of cognitive tests In the past, it has been the custom to compare the brilliant student, lacking in stability and perseverance, with the somewhat dull plodder endowed, however, with great determination—all to the advantage of the latter And such fables as that of *The Hare and the Tortoise* have often been used to drive home the moral that

[1] The name given to the persons upon whom an experiment or test is performed.

[2] *Psychological Tests of Educable Capacity*, p 144

character is the principal thing. We may even go a step further, and point out that in many cases the results of cognitive tests are unreliable, because temperament and character have had a great influence on the cognitive factors. If a given "subject" is more or less uninterested in the work involved in the test, his results will not be a correct measure of his ability. "It is true that John resents problems in his arithmetic book, regarding it (not without some show of reason) as a waste of time to find how many pecks of corn a certain number of horses will eat under distressingly complicated circumstances; while he will cheerfully sacrifice a whole afternoon to puzzle his way through some arithmetical quibble at the end of his *Youth's Companion* or of his *Boy's Own Paper*. Yet, if by any means the teacher can rouse interest in those unfortunate animals, the arithmetical beasts at once get John's fullest voluntary attention."[1] Ordinary school examinations are, of course, cognitive tests of a kind. And considerable reliance may be placed on their results. But frequently the later career of a boy demonstrates that these results are misleading. Interest had not been fully aroused. Certain hidden sources of mental energy had not been tapped. And, as a consequence, the boy was misjudged.

But, even if cognitive tests were absolutely reliable, there would yet remain a further objection which might be made against them. If we were all definitely labelled early in life according to our cognitive ability, our characters would be in danger of serious injury. Those who were marked down as of poor ability would probably be discouraged; and those who were marked high would possibly feel it unnecessary to make all the effort of which they might otherwise be capable. Enterprise and energy would be at a discount.

[1] Adams, *The Herbartian Psychology applied to Education*, p. 261.

Now these are very real objections Yet there remains much to be said in favour of mental tests. On the one hand, *it is important to distinguish accurately* the mentally deficient child from the merely backward scholar On the other, *supernormal children are not always clearly* differentiated from those who, for one reason or another, are fairly well advanced in their studies, without possessing any special ability If mistakes are made in either of these two cases, the child is subjected to an educational course which is unsuited to him The backward child classed as mentally deficient and sent to a special school is in danger of becoming really and permanently deficient *Give a dog a bad name and hang him!* The child of merely "average" ability who is placed in an advanced course, side by side with clever children, is often doomed to discouragement and failure *Determination and industry may do much* But they cannot overcome all obstacles Moreover, they *are in danger of vanishing into thin air*, when the task set them is too great

Mistakes of both these kinds have been made in the past Among little children, timid and reticent scholars, especially if they have defects of sight or hearing, or if they are suffering from adenoids and are badly nourished, may easily be classed as mentally deficient A succession of childish complaints, causing *long absences from school*, may still further handicap a child On the other hand, a child who is physically *strong, and possesses a cheerful disposition*, with great self assertiveness and well developed social tendences, leading him to chatter freely, though without much sense, may pass muster as fairly normal, though he is in reality mentally deficient Quite recently it was noted that in certain parts of London there was a great difference between the numbers of children reported as mentally deficient from the two senior departments—boys' and girls'—of the

same school. In some cases, the difference was far greater than could be due to chance. Fortunately the children are now submitted to mental tests, conducted by specially qualified doctors. In this way, errors are largely corrected. But, if the teachers knew something of these mental tests, and of the principles on which they are based, the errors would be much less frequent.

And with older and more advanced children, the same difficulty presents itself. The selection of children for scholarships is often very defective. The usual examinations are, of course, helpful. They discover the children whose knowledge is sufficient to form the basis for starting secondary work. But often they do not indicate correctly which children are best fitted *to go on to the end of the course*. The children from some elementary schools are more or less specially prepared for the scholarship examination; those from others, for one reason or another, have to take the examination "in their stride." Under the present system, such cases as the following are possible:—

> "E.F. has gained a Junior Scholarship, owing, probably, to special preparation; his low mental ratio should have eliminated him from the list of awards. His most recent report shows that at the Secondary School he is bottom but five in the lowest form, and his want of success, even in subjects taught in the Elementary Schools, is almost as evident as it is in the new subjects taught at the Secondary School."[1]

It appears, therefore, to be necessary that mental tests should be used to supplement the results of the ordinary examinations.

Let us, now, endeavour to understand the general nature of these tests. From what we have already noted, it is obvious that, though they deal with the cognitive side of mind, they are not tests of mere knowledge. They are

[1] *Psychological Tests of Educable Capacity*, p. 157.

often referred to as *intelligence* tests What, then, are we to understand by *intelligence?*

This term, though used freely by all of us, has never received a definite meaning in psychology Modern psychologists, indeed, are very much at variance with respect to what the term should be used to connote We may, however, accept the following attempt at definition "All are agreed that intelligence does not cover temperament or character, and that, therefore, the important personal qualities of will, feeling, and emotion are not dealt with by tests of intelligence Secondly they are agreed that it does not cover *acquired* attainments, hence, tests of intelligence give no indication of what a pupil has learnt in reading, spelling arithmetic, or in any of the higher school subjects Thirdly, it seems generally agreed that any narrow or limited talent, available for only one type of intellectual work, is not to be named intelligence in this sense *Intelligence is regarded by the majority as a component entering more or less into all intellectual activities,* or as some would prefer to phrase it, as the common level of all particular intellectual performances What tests of "intelligence" measure, therefore, is inborn, all round, intellectual ability, using the word "intellectual" in a loose sense to include practical activities as well as theoretical but to exclude processes of emotion and qualities of character"[1]

Other terms which mean practically the same thing are *general ability, native capacity, general intelligence, native ability,* and *native intelligence*

It is very important to distinguish the native intelligence from what we may call the *total* intelligence of an individual in a given department of knowledge or skill The

[1] *Psychological Tests of Educable Capacity* pp. 71 2.

latter is based on the former, but often includes much more—due to *acquired* attainments. I may possess native intelligence which is superior to that of the builder whom I summon to deal with a defect in the construction of my house. But this builder, in dealing with the difficulty, succeeds where I should probably fail. "In this particular sphere, his *total* intelligence is greater than mine. He has spent his life in building and repairing houses, and he possesses a large amount of knowledge and skill in which I am lacking. His *total* intelligence in this sphere is the product of both nature and nurture, the latter playing a very important part; my own is little more than that with which nature has endowed me. To take another example, the late Duke of Devonshire, when President of the Board of Education,[1] is reported to have said, in face of some problem connected with the schools: 'I am a child in these matters.' By this statement, he did not intend to admit any poverty of native 'Intelligence.' He was merely confessing an ignorance of the educational system which affected his *total* intelligence: whether such a person should be placed in charge of the education of the country is a question which it is not necessary to discuss here."[2] It is obvious that an ordinary school examination tests the *total* intelligence, and only indirectly, and more or less imperfectly, the native intelligence of the pupils. Those who have had the more careful preparation, or who have applied themselves with the greater degree of determination and industry, may produce better results than the others, though in native intelligence they may be no stronger than their rivals, possibly even inferior to them.

[1] At that time called—*The Education Department.*

[2] Dumville, *The Fundamentals of Psychology* (Second Edition), pp. 379 80.

It is also very important to bear in mind that though native intelligence is independent of any specialised knowledge or skill, it is not independent of *all* cognitive and motor acquirements It cannot develop and it cannot function *in vacuo* It presupposes the experience which is common to all normal human beings "A person might have a brain *capable* of the highest degree of development. But if he is not put in a civilised environment, these higher centres[1] will not be developed We hear, for instance, of the wild boy of Aveyron, who had been abandoned in the woods at an early age, and who had managed to survive without the usual attention bestowed on children by their parents When discovered, he was speechless, and, from the human point of view, almost devoid of any powers of discrimination, [2]

All tests of native intelligence therefore assume the general knowledge and skill possessed by normal human beings of the age in question But they must not assume more And here there are often disputes with regard to certain tests some maintaining that these require special knowledge which is not common to all the individuals tested *Money* for instance, is a thing with which (very young) children from different homes vary very much in their familiarity There is of course, no objection to requiring a child to count a number of similar coins. But when the test turns on the value of different coins it is a question rather of special knowledge than of general ability [3]

The pioneer of tests of intelligence was a French psychologist Alfred Binet (1857 1911) And it was in the task of distinguishing mentally defective children that he first

[1] See pp. 15 ff.

[2] Dumville, *op. cit*, pp. 106-7

[3] Dumville A Trial of Binet's Tests on Five-Year Olds, *Journal of Experimental Pedagogy*, June, 1913 p 117

9 mths MENTAL AGE 6 yrs

TEST AGE	REMARKS OR QUOTATION OF ANSWER
3	
4	
5	
6	Don t know (4) Shakes head (o) You know don t you? (nods) Don t you know? (shakes head) me 14 2nd t me (m sses one then goes over one aga n)
7	ear I sa d Then goes r ght d a cart (?) Lady and a man (3) Man on a horse
8	(?) — (3) — (4) Hands behind

r ((

made his mark in this field. His success constrained him to extend his tests in order to make them suitable to the measurement of the intelligence of ordinary children. Aided by his colleague, Dr. Simon, he tested large numbers of children in the elementary schools of Paris, and standardised his tests in accordance with the results.

These tests have been translated into English, have been somewhat modified as the result of experience, and are still used to determine the degree of development of intelligence in children. They consist of a number of questions and commands, arranged in order of difficulty, and cut up into sections, each section comprising those questions and commands which are considered appropriate to normal children of a given age. The ages range from 3 to 15 years, and there is a final set of tests for "over 15."

It is extremely doubtful whether there is any appreciable development of native intelligence in normal human beings beyond the age of 16. Dr. Ballard, by a totally different set of tests, has recently confirmed this conclusion.[1] This must not, of course, be taken to mean that what we have called the *total* intelligence of an individual in any given department does not go on increasing through life. On the contrary, the acquirement of additional knowledge or skill may go on indefinitely, with a corresponding increase of *total* intelligence in the particular sphere involved.

The accompanying table gives Binet's tests for the ages from 3 to 8 years. It is extracted from the actual forms used by the author in a trial of these tests in the year 1913.[2]

[1] Ballard, "The Limit of the Growth of Intelligence," *The British Journal of Psychology* (*General Section*), Vol. XII, Part 2, Oct., 1921.

[2] Dumville, "A Trial of Binet's Tests on Five-Year Olds." *Journal of Experimental Pedagogy*, Vol. 2, No. 2.

The statements of questions and commands indicate with fair clearness the nature of the tests A few words of explanation, however, will be helpful

The pictures shown in the third test for the age of 3 are "story pictures, not mere landscapes Binet used three The first represents a man and a boy pulling a handcart laden with all their worldly possessions The second portrays an old man and a woman, apparently younger, sitting huddled on a bench on the boulevard, the old man is leaning back either asleep or dead, and the woman clings to him with anxiety and woe clearly written on her face The third picture represents a prisoner standing on his bed, and looking out of the window of his cell At the age of 3, the child is expected merely to enumerate the chief objects But at the age of 7 (Test ii), some amount of description or explanation is required. Thus, with the first picture, ' A man and a boy and a cart" would pass muster at 3, but at 7 some answer such as, "A man and a little boy pulling a cart" or 'People who are moving" would be expected

The lines referred to in the fourth test of age 4 are two parallel lines, three centimetres apart, the one five centimetres and the other six centimetres in length Hesitation must be taken as failure

In the first test for the age of 5 years, the boxes were all alike in appearance They were large pill boxes into which sufficient sand and cotton wool had been put to cause them to weigh the prescribed number of grams They were presented to each child in pairs as indicated by the numbers

The fifth test for the same age consists in arranging the two halves of an oblong card (which has previously been cut across diagonally) so as to form an oblong once again. An uncut card is placed on the table as a model, and the

two pieces are arranged with the sides which originally formed the diagonal as far removed from each other as possible (see Fig. 15). The tester must be careful (1) that the child does not fail because he is indolent; (2) that one of the pieces does not get turned over or otherwise shifted so as to suggest the required arrangement; (3) that he (the tester) does not show by a look or other movement whether the child is proceeding rightly or wrongly.

Fig. 15.

The square used in the second test of the same age is drawn by the tester with sides of about an inch in length, and the child is asked to copy it *with pen and ink*. The child should be allowed to make three attempts. Two at least must be free from bad curves and overlapping ends. Thus A, B and C in Fig. 16 must be rejected; while D and E should be passed.

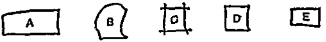


Fig. 16.

Test (iii) for the age of six has also to be done with pen and ink. Binet accepted such results as 1, 2 and 3 in Fig. 17, but rejected 4, 5 and 6.

In Test (ii) of the age of 6, definitions by use are expected. Thus, in answer to the first question, "What you eat your dinner with" would be accepted.

[illegible] (v) [illegible] the same age, the accompanying pairs of [illegible] are presented to the child. The latter [illegible] the prettier face in each of the three cases

[illegible] age 7, four colours are shown—red, yellow, [illegible]. The tester passes rapidly from one to [illegible]

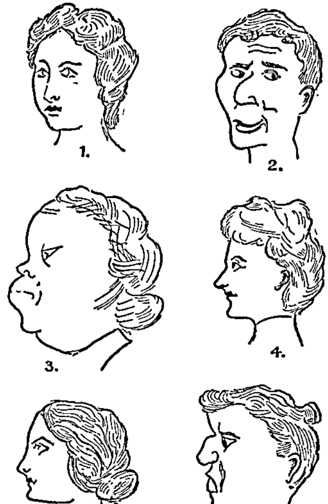


Fig. 18.

In Test (v) for the same age, the accompanying pairs of faces (Fig 18) are presented to the child The latter must choose the prettier face in each of the three cases

In Test (v) of age 7, four colours are shown—red, yellow, blue and green The tester passes rapidly from one to another

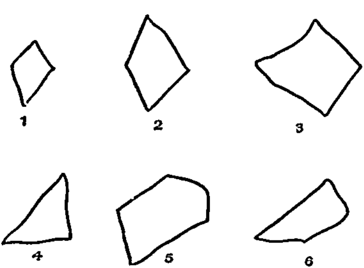


Fig 17

In Test (iii) of age 8, three faces are shown, the first without an eye, the second with the mouth lacking, and the third minus the nose (Fig 19) Lastly (though not mentioned in the table) the full length picture of a woman without arms is indicated, and the question asked "What is missing here?" Three correct answers must be given out of four

The following directions have been given with regard to the manner of conducting the tests

"When confidence is assured, the child's age is ascer

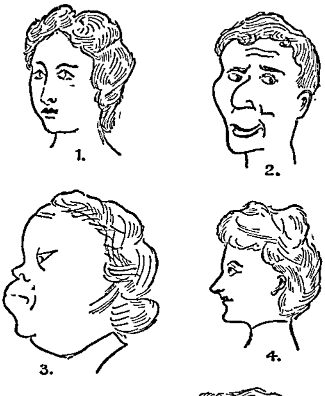
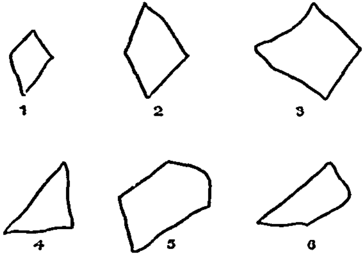


Fig. 13.

In Test (v) for the same age, the accompanying pairs of faces (Fig 18) are presented to the child The latter must choose the prettier face in each of the three cases

In Test (v) of age 7, four colours are shown—red, yellow, blue and green The tester passes rapidly from one to another.



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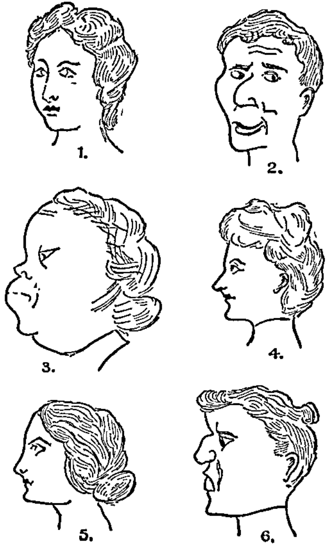

Fig. 18.

tained and the tests for that age given: should he accomplish all or all but one, he is adjudged at the level of that age, and is then subjected to *all* the tests of the succeeding ages. If he accomplishes five of these, a year is added to his level; if ten, two years. But if the child fail in two or more of the tests appropriate to his own age, he is put through the tests of each preceding year in turn until that year is found in which he *can* accomplish all the tests or all but one; he is then subjected to the tests of the ages succeeding the year of his age by birth.

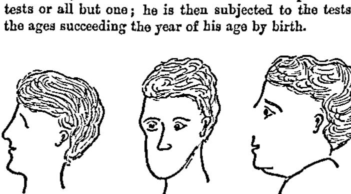

Fig 19.

"Judgment is passed at once on the answer, + signifies that the test has been accomplished, — that the child has failed, (?) represents that a doubt exists in the mind of the investigator, and a blank indicates that the test has not been set, no answer is signalled by a zero."[1] In some cases, the writer ventured to use the mark of exclamation (!) to indicate a particularly smart response.

It will be noticed that the tests indicated in the table do not go beyond the age of 8. The children tested were all of the age of 5, and it was not found necessary in this

[1] Miss Katharine L. Johnson, "An English Version of M. Binet's Tests," *Training College Record*, Nov., 1910, p. 90.

instance to go beyond the age of 8. It will be noted, moreover, that the child whose results are shown failed at every test set for the age of 8.

After many trials of these tests in English-speaking countries, considerable changes have been made in them. The number of correct responses given in each case, when a large number of children are tested, is a measure of the difficulty of the test. The greater the number, the easier is the test, and *vice versa*. In this way, it has been found that certain tests are too difficult for certain children of the age for which they were originally arranged, and that others are too easy. Thus the fifth test given in the preceding table for the mental age of three has been found a little too difficult, and has been transferred to the age of four, while the first and second tests originally prescribed for the mental age of four have been found too easy, and have been placed among the tests for the age of three. Below will be found the new arrangement for the first three years.[1] This new arrangement is called the *London Revision*. It is claimed for this that the tests are placed in the order of their average difficulty for English children.

AGE THREE.

1. Points to nose, eyes and mouth.
2. Repeats two numbers (one trial correct out of three), *e.g.* 3—7, 6—4, 7—2.
3. Knows own sex, whether boy or girl.
4. Gives name and surname.
5. Names knife, key and penny.
6. Enumerates items in two pictures out of three.

AGE FOUR.

7. Repeats six syllables: "I am cold and hungry."
8. Repeats three numbers (one trial correct out of three), *e.g.* 9—1—4, 2—8—6, 5—3—9.

[1] Quoted from *Psychological Tests of Educable Capacity*, pp. 200-1.

9 Counts four pennies
10. Points to longer of two lines.
11 Points to prettier faces in three pairs.

AGE FIVE.

12. Performs a triple order putting key on table, shutting door, and bringing book
13. Copies a square recognisably
14 Repeats ten syllables.
15 Gives own age
16. Distinguishes morning and afternoon
17 Names four primary colours blue, yellow, green and red.
18 Repeats four numbers
19 Compares two weights in three pairs, differing by 9 grammes (*e g* 3 and 12 grammes, 6 and 15 grammes)

For further details of these and other tests the reader is referred to the special treatises on this subject,[1] being warned, however, that it is futile for anybody to attempt to apply these or any other mental tests without a thorough preparation, both theoretical and practical

It is claimed that by means of such tests as Binet's we can ascertain the *mental age* of a child By this is meant the age of the normal or average child possessing the same development of general intelligence as the individual tested In some cases, a child will show the intelligence of an age more advanced than his real age, in others, his intelligence will be that of a normal child who is younger According to some authorities a difference of two years between the real age and the mental age indicates that the child is abnormal—*supernormal*, if his mental age is two years above his real age *subnormal* or *mentally deficient*, if his mental age is two years below his real age

Probably, however, a difference of three, or even four, years would be a safer criterion No definite rule has

[1] *Psychological Tests of Educable Capacity* (Board of Education) is a recent publication spec ally to be recommended

been agreed upon in this matter. Moreover, it is to be noted that a given difference means much more in the case of a young child than in that of an older one. A child of six who shows the intelligence of a three-year-old is probably far more mentally deficient than a child of twelve who has the intelligence of a normal boy or girl of nine. For this reason, "it has been maintained that a better method of expressing the mental status would be the 'mental quotient' (M.Q.) .. The M.Q. is obtained by dividing the Binet mental age of an individual by his chronological age . . . "[1]. Thus our child of six with the intelligence normally possessed at three would be said to have a mental quotient of $\frac{3}{6}$, *i.e.* ·5; while the child of twelve with the intelligence of nine would have as M.Q. the fraction $\frac{9}{12}$, *i.e.* ·75.

The Binet Tests have given rise to many other series of tests for intelligence. And there is ample room for these. In the first place, it is perhaps possible to improve on Binet's attempt, obtaining tests which give more accurate results. Secondly, alternative tests are necessary where there is any suspicion that the subjects have already some acquaintance with Binet's Tests. Further, Binet's Tests do not seem so reliable in the higher reaches of intelligence as in the lower. And lastly these Tests require a large amount of time, each child having to be dealt with individually.

Dr. Ballard has gone far to remove these difficulties in many of the ingenious tests for which he is responsible. Let us select, as an example, what he has called the *Columbian Mental Tests*.[2] These are specially suitable for

[1] E. O. Lewis, "The Binet and Point-Scale Methods of Testing Intelligence," *Journal of Experimental Pedagogy*, Vol. I, No. 4, p. 199.

[2] Ballard, *Group Tests of Intelligence*, Chap. [illegible]

ordinary children between the ages of 10 and 14 A whole group of children can be tested by them—neglecting the time occupied by marking—in little more time than it takes to apply the Binet Tests to one child They are conducted in the same way as that in which an ordinary examination or class test is given, the great difference being that general or native intelligence is the subject of examination instead of specially acquired knowledge or skill Such tests are called *Group Tests of Intelligence*

The Columbian Mental Tests consist of six separate sets of 'questions' each set containing sixteen items, except the last, which has twenty With one mark given for each correct response or answer the possible maximum is thus 100 For each of the first four tests, the time allowed is five minutes For the last two there is no time limit We give below the first two and the last two "questions" in each of the tests

TEST I —OBEYING ORDERS

Five Minutes.

1 Print the first letter of the alphabet.
2. Make a cross and put a ring round it.

* * * * *

15 Draw a triangle unless there are more days in the week than there are weeks in a month in which case draw a circle.

16. If this sentence contains more words of less than three letters than words of more than three letters write the first letter of the last word, if it contains less write the last letter of the first word

TEST II.—MIXED SENTENCES.

Five Minutes.

Make the sentence sensible and write down its last word

1 Are round apples.
2. Grow bushes blackberries on

* * * *

15. Generally those us who to are love we kind.
16. Some a pity do that is work it not like people.

TEST III.—ANALOGIES.

Five Minutes.

Find the fourth word:

1. Leg *is to* knee *as* arm *is to* . . . ? (hand, wrist, elbow, sleeve).
2. Father *is to* son *as* mother *is to* . . ? (sister, daughter, aunt, brother).

* * * * *

15. Manners *is to* morals *as* politeness *is to* . . ? (politics, society, kindness, virtue).
16. House *is to* rent *as* capital *is to* . . . ? (labour, interest, country, money).

TEST IV.—NUMBER SERIES.

Give the next two numbers in each row:

(1)	12	11	10	9	8	7
(2)	1	3	5	7	9	11
	*	*	*	*	*	
(15)	1	4	9	16	25	36
(16)	1	2	4	7	11	16

TEST V.—BEST REASON.

Write down the letter that stands before the best reason or the best answer.

1. When a little girl loses her doll she should—
   A. Cry till somebody finds it for her.
   B. Think where she is likely to have left it and look there.
   C. Search in father's pockets.
   D. Ask her mother to buy her a new one.
2. If you are caught in a shower far from home and have no umbrella you should—
   E. Take shelter till the shower passes.
   F. Run all the way home.
   G. Ask a policeman to lend you an umbrella.
   H. Borrow the money to buy a mackintosh.

* * * * *

15. We eat turkey on Christmas day because—
   K. It goes well with plum pudding.
   L. Turkeys are expensive.
   M. It has become the custom.
   N. Turkeys are intended to be eaten at Christmas.

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The attempt to establish age norms for native intelligence has led on to an endeavour to find age norms for what we have called *total* intelligence in each of the different branches of the school curriculum. If one stops to reflect, it will become evident that up to the present teachers have had somewhat hazy ideas as to what should normally be expected of an "average" child at each age during the school career. To remove this haziness, Dr. Ballard has framed a number of tests which, being used in various schools, first give us a clear notion of what the normal child has acquired at each age of his school life, and then can be used elsewhere as a means of measuring how far the new "subjects" are above or below the norms of their respective ages. These may be called *scholastic tests.*

To test mechanical arithmetic, for instance, Dr. Ballard has constructed a series of 100 questions which can be put to any class in any ordinary school, the number of right answers being an indication of the stage of progress reached. Fifty minutes are allowed for the test. Below we give the first three and the last three of the questions.

MECHANICAL ARITHMETIC.[1]

Work in your head if possible. Scrap paper allowed.

1. 8 + 5.
2. 9 + 6 + 8.
3. 8 + 7 + 13.

98. Area of all the faces of a cube of 2 inch edge.
99. Volume of water in a tank 2 ft. long, 2 ft. wide, 1½ ft. deep.
100. Find radius of circle with area of 154 sq. ft. ($\pi = \frac{22}{7}$).

A similar set of questions has been framed by Dr. Ballard to test the capacity of a child in "problem" arithmetic. Once again, there are 100 questions in all; but the time allowed in this case is one hour. Below are the first three and the last three.

[1] These tests are given in full in *The New Examiner* (Hodder and Stoughton). Copies can also be bought separately, in dozens, at reasonable prices.

16. The sea is salt because—
    O. There are salt rocks at the bottom.
    P. Salt fish swim about in it.
    Q. People put salt there many years ago.
    R. Rivers constantly carry a small amount of salt into it.

TEST VI.—COMMON SENSE.

John has a sister Jane, a brother Dick, and a cousin Tom. Answer the following six questions about these people:

1 Who is Dick's sister?
2. Who is Jane's cousin?

* * * * *

Now answer the rest of the questions:

* * * * *

19. A cyclist rode a mile on an old fashioned bicycle which had a big wheel in front and a little wheel behind. Which wheel went round the larger number of times—the *big* or the *little*?

20. Read the last question again. Which of the wheels travelled the faster?

These tests are printed or cyclostyled in a little booklet, a copy of which is supplied to each child.[1] In each case except Test VI, a couple of similar examples are examined beforehand, and the children are invited to give the solutions, the object, of course, being to insure that the children clearly understand what they are required to do. Then, at the word of command, a start is made.

Dr. Ballard has given the Columbian Tests to about 1,000 children. This number is not sufficient to establish *age norms, i.e.* marks to be expected from normal children at different ages. The results already obtained, however, point to the following norms—

Age	10	11	12	13	14
Norms	32	42	50	55	58

[1] Printed copies can be obtained (2s. net per dozen) from Messrs. Hodder and Stoughton, London.

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ARITHMETICAL REASONING

Work the following sums in your head.

1 Jane is 18 years old. If Sarah were 5 years older she would be as old as Jane. How old is Sarah?

2. What number is half way between 12 and 16?

3. A man is taller than his wife by 3 inches, his wife is taller than his daughter by 5 inches. The daughter is 60 inches high How high is the man?

* * * * * *

98 A man walks 5 yards to the north, 5 yards to the east, 5 yards to the south, and then 5 yards to the west. How far is he then from the starting point?

99 If in secretly sending numbers to a friend I agree to write 7 when I mean 3 and 11 when I mean 7, what should I write when I mean 10?

100. The first even number is 2 the second is 4 and so on. What is the hundredth even number?

These tests in arithmetic can be given to boys of all ages beyond that of mere beginners The norms have been worked out as follows

MECHANICAL ARITHMETIC

Age	9	10	11	12	13	14
Boys' Norms	11	20	29	38	46	53
Girls' Norms	11	17	23	29	36	44

ARITHMETICAL REASONING

Age	9	10	11	12	13	14
Boys' Norms	12	23	35	41	47	53
Girls' Norms	10	15	20	31	37	43

It will be noted that the girls are distinctly inferior to the boys in both performances Other investigations have shown the same difference This difference appears to be due not to variations in the quality of the teaching, but to a fundamental difference in arithmetical capacity between boys and girls

It must not be expected that in any particular school these norms will necessarily be approached. Only in an "average" school would there be a likelihood of correspondence with the results given. The best elementary schools would probably be about two years in advance of these norms, while the worst would probably be two years behind. Central schools, which have specially selected pupils, have given results which are about three years in advance.

These conclusions have been largely confirmed—at any rate in the case of the older children—by the results of ordinary examination. In March, 1924, the inspectors of the London County Council made an investigation into the standard of attainment in public elementary schools. They selected "average" schools in all parts of London, and also a few in which the social conditions were specially good or bad. They called the specially good schools "A" schools, and the specially inferior ones "B" schools. In all the schools, they examined all the children who were within one year of the statutory school leaving age. The numbers examined were—

	Boys.	Girls.
In "normal" schools (48 departments)......	1,095	1,117.
In "special" ,, (14 ,,)......	319	442.

These pupils were examined in arithmetic, English, history and geography. We are here only concerned with the arithmetic. In this subject 18 sums were set, to be worked in 75 minutes. We give below the first three and the last three.

1. Add 17, 39, 54, 82, 67 and 95.
2. Subtract 35,982 from 76,468.
3. Multiply 3,817 by 37.

* * * * *

16. Find the cost of covering the floor of a room 18 ft. long and 12 ft. 9 in. broad with linoleum at 5s. per sq. yard.

17 What would be the length, in yards, of a fence surrounding an oblong field ¾ mile long and 3 furlongs broad?

18 On sale day goods are sold at a reduction of 25% A woman pays 15s 9d for a hat. What was the price before the reduction?

The mean scores (100 being the maximum) were—

Boys			Girls		
A Schools	Average Schools	B Schools	A Schools	Average Schools.	B Schools
68 8	58·7	54 1	58 4	53 7	40

The mean numbers of sums worked correctly (out of 18) were—[1]

Boys			Girls		
A Schools	Average Schools	B Schools.	A Schools.	Average Schools	B Schools
11 3	9 8	9 4	9·9	9·2	7·0

It will be observed that Dr Ballard's tests are more severe than the examination of the inspectors The latter seems scarcely difficult enough to extend the very best *scholars to the full Thus in the 'A" schools, we find* that no less than 19 1 per cent of the boys obtained from 90 to 100 per cent of the marks The inspectors' test seems best suited, with regard to difficulty, to the 'average" schools

The present is an appropriate moment for calling attention to the degree of difficulty which a test or an examination should have. In the past, many teachers had a notion that the ideal result of an examination was that all the

[1] For further details, both of the results in arithmetic and of those in the other subjects, see the pamphlet on *Standard of Attainment in Public Elementary Schools* (available in the archives of any London elementary school).

better prepared than was expected If the "skewing" had been to the left, it would have indicated that the test was somewhat too difficult for these pupils

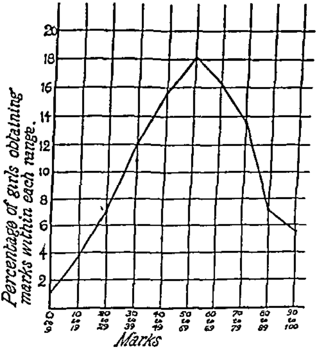

Fig 20

Teachers who resolve to make similar graphs to illustrate the results of their own examinations should bear in mind that with smaller numbers there is a likelihood of greater irregularity in the 'curve" To lessen this danger, so that the general tendency of the distribution may be evident, it would be advisable to arrange the children in somewhat larger, and consequently fewer, sections, i e to have bigger ranges

With very large numbers—many thousands—the "curve" would become a fairly smooth one, as in Fig. 21.

Experience in statistical investigation has shown that in the case of properties which are possessed by human beings, animals, or plants, and which we attempt to measure, it is

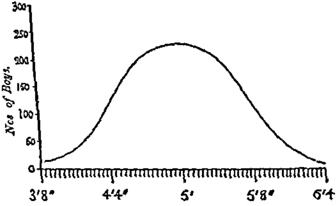

FIG. 21.—CURVE SHOWING DISTRIBUTION OF BOYS IN SECONDARY SCHOOLS OF A LARGE TOWN ACCORDING TO THEIR HEIGHTS (HYPOTHETICAL)

always found that if we have a good selection to work on—*i.e.* if we are not dealing with a group containing an abnormal proportion of superior or inferior instances—there is a more or less uniform distribution of examples of the various degrees of the property in question, this distribution following the principle which we have illustrated. And, since the results of school examinations depend largely on the innate qualities of the pupils, the teacher of a fairly normal class can ascertain whether he is conducting his examinations on satisfactory lines by plotting out the results and determining whether they are in harmony with the general principles of measurement in the field of living creatures.

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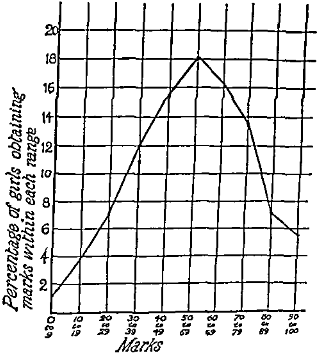

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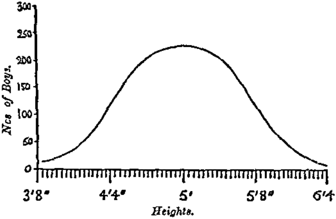

Fig. 21.—Curve showing Distribution of Boys in Secondary Schools of a Large Town according to their Heights (Hypothetical)

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The limits of space prevent us from giving full details of Dr Ballard's tests in other subjects. Let it suffice to indicate very briefly the nature of some of them Below is a portion of the test in silent reading, *understanding* the matter being, of course, the chief thing required The whole test material occupies three pages of close print. Children are allowed 15 minutes to do the test, adults, 10 minutes

SILENT READING (B)

Wherever a number appears there is one word and only one word missing The word has to be written on your answer paper opposite its proper number

Jane had two dolls, one with black hair and the other with brown. She liked the doll whose hair was brown, but did not like the doll whose hair was (1)

A little boy was sent to fetch three eggs from a nest and bring them to his mother On the way back he fell down and broke two of them, so he was able to give only one (2) to his (3)

In history and geography, the tests remind one very forcibly of the short tests which all thorough teachers when pressed for time, are accustomed to give their pupils. The chief innovation consists in giving a large number of statements some of which are true, some false, and some doubtful, the pupil being required to write "Yes," "No," or a dash to indicate in which category he places each assertion The following, for instance, are three of the statements in history

(61) On the whole the Tudors were strong rulers and the Stuarts weak

(62) The Reformation increased the influence of the Church in state affairs

(63) The suppression of the Monasteries by Henry VIII. proved of benefit to the poor

According to Dr. Ballard, the usual examinations in history and geography consist largely in *essay* writing, thus testing the power of expression more than knowledge. There is something to be said for this view. But the comprehensive grasp of a subject is a great deal more than the knowledge of isolated facts, and with carefully framed questions, mere "fine writing" can be placed at a discount.

Further, it is scarcely to be deplored that composition enters so largely into these subjects—especially in a country where verbal expression, whether written or oral, leaves so much to be desired. If the teachers of all subjects—even of arithmetic—could be brought to realise that they are teachers of *English*, the only difference being that in each case the subject-matter is changed, we should hear less of the poverty of English composition in our schools. One or two lessons per week in English composition are quite inadequate to the task of developing power in verbal expression. But even these could be largely dispensed with, if in all subjects correct and full expression of thought were required from each pupil. Thought and expression are very closely connected; they are the two sides of one and the same thing. "There is no doubt that the teachers of the past generation have failed to appreciate the importance of stimulating the children to express themselves in good language. They have often been satisfied with mere listening on the part of the children, followed by the answering of a few questions. But the answering of a question usually necessitates only a few words—sometimes only one. As a consequence many children have grown up without ever having been required to give *a connected account* of anything."[1]

The spirit of testing is ever growing. In the field of

[1] Dumville, *Fundamentals of Psychology*, p. 125.

business, *tests are now being devised* to determine the fitness of young people for the occupations which they desire to take up Such tests are often called *vocational tests*

* * * * *

With all our testing, whether of native intelligence or of the *total* intelligence in any particular branch, we miss that core of emotions and conations—more fundamental and more important than cognition—which is usually known as *character* Many brilliant intellects have completely failed on account of its weakness, many men of comparatively mediocre talents have triumphed by its power

What has modern psychology to say with regard to the education of this side of man's nature? Hitherto, although life itself has furnished data for the estimation of character, no exact measurement by tests or other artificial means has been found possible And probably such will for ever be the case

Yet, while one set of psychologists has been incessantly active in devising tests of the intellectual powers, another, and perhaps equally important group, has pursued investigations which have thrown such light on the development of character as to modify very considerably the educational outlook of some and to confirm and intensify the aspirations of others

The body of doctrine which has been produced by the latter group of investigators is usually known as *psychoanalysis* The originator of this new departure was Professor *Freud of Vienna* *He has been followed in this* field by his most distinguished pupil, Professor Jung of Zurich, who has introduced many modifications into the doctrine of his master, Perhaps the most prominent of English exponents of these views is Dr William Brown, who, after devoting much time to the experimental psycho

logy of cognition,[1] has gone over to the other department of the science, and, fortified by his experience as a specialist in cases of shell-shock during the war, has produced several valuable treatises on the subject.[2] In these, it will be seen that while Dr. Brown is inspired by Freud, he is not a blind follower of the master, but rather an independent thinker and investigator, amplifying and modifying the original doctrine at many points.

What, now, are the broad outlines of the new doctrine? We can, perhaps, best indicate them by a concrete example. King Edward VII, we are told, scarcely read anything beyond periodicals. He was not in any sense a student of serious works. Without probing further, to discover other weaknesses in his character, we may well inquire as to the causes of this superficiality. In the recently published life of our late sovereign, by Sir Sidney Lee, we read that in his youth the prince was overwhelmed by staid and serious pastors and masters. His pedantic father prescribed a course of reading and study for him which would no doubt have killed the enthusiasm even of a naturally philosophical and reflective person. The young man was denied the society of congenial persons of his own age. Every moment of his youth was to be devoted to the task of improving his mind. And his mother, Queen Victoria, not only seconded the efforts of her consort, but greatly increased their force by the strength of her exceptional personality, and continued them with unabated zeal when death brought the paternal influence to an end.

Now there is little doubt that the prince had a sincere

[1] At King's College, University ot London, where he was Lecturer in the subject.

[2] The beginner is advised to read his *Talks on Psychotherapy* (University of London Press).

regard for his parents And possibly he would have been the first to resent any suggestion that he nurtured any repulsion with regard to them But, deep down in his nature, there was probably a system of emotions, tendencies, habits and vague ideas, which constituted a dislike, hidden from the subject himself This *complex*,[1] as the psycho analysts call it, was in all likelihood due to the severe repression of the natural tendencies of the young prince

We see, then, that a *complex* is what we have already called a sentiment, but that it differs from the more ordinary form of sentiment in being hidden—the subject himself being often unconscious of it. It results from the damming of the primitive conations or instincts by repressive forces These conations, with their attendant emotions and more or less vague ideas being unable to *satisfy themselves in a normal way*, become sources of pain, and are "shut off" or dissociated from consciousness Being *the most fundamental factors in the psyche*, they cannot be stifled out of existence, They live on in the depths of the soul, though more or less separated from fully conscious processes, and may cause such a splitting of the personality as to imperil the sanity of the subject Such a splitting or dissociation is called a *neurosis*

A neurosis may cause serious ill health and lack of efficiency The only means of curing it is by bringing the repressed elements to the surface and re associating them with the remainder of the mental factors, so that unity is restored

But how can they be brought to the surface, if they are not known to consciousness? This is the work of the psycho analyst This specialist endeavours to discover

[1] The term was first employed in this sense by Dr Jung

what the subject himself often ignores. He can employ one or more of three means—(1) the analysis of dreams, (2) the examination of associations, (3) hypnosis.

Dreams, according to the Freudians, are often most instructive phenomena to those who can interpret them. They may, indeed, in many cases be due to a laboured digestion during sleep. And, often, other discomforts besides digestive ones may influence their course. Thus, if the feet are uncovered and become cold, the subject may dream that he is walking on ice, or stepping into cold water. But often a deeper meaning has to be sought.

The psycho-analysts believe that in the dream the deep-seated and more or less unconscious part of one's nature, which during the period of waking life is controlled and checked by the influences of civilisation, is able to assert itself in some measure. This more primitive part of man's nature is often referred to by Freud, Jung, and their disciples as the *unconscious mind*. It is likened by one writer, Lay,[1] to an unknown Titan within us. And the conative urge proceeding from it is often called the *libido*.

According to Freud, the *libido* is almost entirely sexual in character. In other words, this writer maintains that the sexual instinct plays the dominant part throughout life—even with young children. The word "sexual" is not here used in the most precise and narrow sense. It refers to all feelings of attraction or affection, whether between persons of different sexes or between those of the same sex. But even with this wide meaning, there are many who differ from Freud. Jung, for instance, assigns a much inferior influence to the instinct in question.

Now the Titan is often more or less out of harmony with

[1] Lay, *Man's Unconscious Conflict*.

the social influences around him in waking life He may, indeed, be definitely checked and grieviously wounded by the rebuffs and repressions to which he is subjected When this is the case, he is disposed to shut himself off more completely from the remainder of the nature of which he forms a part, *to retire into the depths of the personality*, and there to nurture the desires and aspirations which cannot be permitted to satisfy themselves in waking life Often these desires and aspirations, together with the emotions which accompany them, become more and more concentrated on the ideas of the person or thing which was responsible for their failure to find satisfaction in ordinary life The Titan thus becomes a brooding hermit. He absorbs a large amount of the conative energy at the dis posal of the personality of which he forms a part, expend ing it in mere idle imaginative satisfaction of his desires, in more or less absurd phantasies with regard to the person or thing responsible for his failure This is the phe nomenon which we have called a *complex* And if it goes on developing, it may lead to complete dissociation of one part of the personality from the other

But it is possible for this complex to be *discovered by* analysis of the dream *Dream analysis* as it is called, is necessary because although the dream is the expression of the cravings of the Titan, *i e* of an *unconscious wish*, it is usually much disguised For, even in sleep, although much of the control of waking life is removed, there still remains some sense of propriety The repressing forces which still exist *have been personified by* Freud *and his followers* and are often referred to as the *Censor* The Titan has thus to put his fancies in such a form as to pass the Censor The dream, therefore as it actually occurs, is often a thing very different from what it really means As it actually occurs, it is called by the psycho analyst the *manifest dream* The true

meaning underlying the disguise is called the *latent dream*. It is the task of the psycho-analyst to discover the *latent dream*. For this reveals the nature of the complex. The subject can usually describe to the analyst his *manifest dream*. But he is oblivious of its interpretation.

Let us now take an example. The following case is quoted by Mr. G. H. Green in his interesting book on this subject.[1] It is the dream of a boy of nine.

"I was in Rome, where I met the Emperor Augustus. He was pleased with me and made me second to himself. I fought for him and lent him large sums of money. But he was ungrateful, so I fought against him and beat him. I took the princess from him and married her, and made myself the first man in the kingdom."

This manifest dream, like all others, deals with material accumulated in actual experience. At the time in question, the boy was reading adventure, classical history, and fairy tales. This accounts for the nature of the characters. But it does not explain the *plot, i.e.* the *latent dream*.

The skilful analyst by judicious questions, and also by encouraging the subject to let his mind run on under the guidance of casual associations, often gets hold of certain *nodal ideas*, which reveal the aspirations of the Titan. In this case, for instance, it was discovered that the dreamer identified *his father* with the Emperor Augustus. And some explanation such as the following will account for the dream. The boy's unconscious self or Titan had been wounded by the large share of attention given by his father to other members of the family. In particular, his jealousy was aroused by the affection displayed by his father with respect to his mother. And all this without his being aware of it. The Titan, by clothing his checked aspira-

[1] *Psychanalysis in the Classroom*, p. 214.

whether they would prefer wine from a bottle marked with his or his sister's name, when he was playing with a toy railway-station refreshment trolley. All this time, the little girl was sleeping badly and her emotional state was seriously disturbed. Presently she volunteered information about her dreams, which was all too significant. She frequently dreamt that all her friends and relations were dead and she alone left alive. Here the psycho-analyst learned the secret of the impossibility to form a French plural. The child *wanted no plural*, other people were distasteful to her—dead—which to the child means gone away[1]—only she herself was to be left, *the singular and first person at that*."

Of the other means of discovering repressions and the unconscious conflicts to which they give rise we can make only brief mention here. There is, indeed, little need to elaborate them in this place, since they are even more technical in character than dream analysis. And it should be clearly understood that teachers and others who are not experts should refrain from meddling in these matters.

First, then, of what may be called *association tests*. Any word mentioned to a subject will suggest another. Thus *sea* may suggest *shore*, *cup* may suggest *saucer*, and so on. It is found that on the average a given subject takes about the same time for each suggestion to take effect. The average time varies from subject to subject, and is often referred to as the *reaction time* of that subject. But, if there is some disturbing element, such as the emotion caused by a complex, the reaction time is greatly lengthened. Now this happens when the word given as the stimulus is closely connected with the ideas bound up with the complex. And the delayed reaction thus betrays something of the

[1] For this reason the "Censor" could pass the dream with all its lack of disguise.

complex to the analyst The latter, of course, must have some notion of what he is seeking He then frames a list of 100 words to be given as stimuli Here and there in this list he introduces words which he believes have some connection with the complex If there is delay in reacting to these words, he is confirmed in his suspicions The analyst frequently discovers in this way certain nodal ideas which reveal the character of the patient s difficulty When the nature of the repressed craving has been ascertained, the whole complex can be brought to the surface, the emotion can be worked off, and unity of consciousness restored

Lastly, it is possible to resort to *hypnotism* The hypnotic trance is a condition, not unlike sleep, in which the subject, though profoundly insensible to sense stimuli generally, reacts to stimuli coming from the operator, as by obeying a command or by recalling events or experiences which could not be recalled in ordinary consciousness The results obtained by doctors in "shell shock" cases during the war have proved beyond doubt the efficacy of hypnosis Men were brought in paralysed and unable to speak, as a consequence of their terrible experiences at the front. They were suffering from a form of neurosis called *hysteria* Their minds were in a dissociated state much more alarming than the cases we have noted in ordinary life

Dr Brown describes the treatment as follows "One asked the patient to lie down on the stretcher, relax his muscles, close his eyes, and think of sleep—calmly and without effort to let his mind dwell on the idea of sleep One told him that his eyelids were getting heavier, that after one had counted three he would be unable to open his eyes, and so on That always worked with shell shock cases showing dissociation They were all so easy to hypnotise One then proceeded to suggest to him that his lost memories would come back, that when one put one s hand

on his forehead he would see all that had happened (at the front). If the patient was dumb, he would then begin to shout out. If he was paralysed, he would begin to move again. One encouraged the patient to live through the experiences again with great emotional vividness, with the result that the dissociation disappeared—he became reassociated."[1]

Dr. Brown adds the following explanation: "One produced this reassociation by producing a further dissociation (that of the hypnotic trance). One made the patient unable to open his eyes; one dissociated this power from the other powers of his mind and nervous system; but incidentally one increased the patient's suggestibility,[2] and through doing so one was able to bring up his lost memories and thus reassociate his mind, and this carried with it other reassociation."[3]

Similar results have been obtained by the application of hypnotism in serious cases of neurosis brought on by the repressions of more ordinary life.

One of the most remarkable results obtained by hypnotic treatment has been that the patient in some instances could go back to the earliest years of infancy and narrate circumstantially events of which he had not the slightest remembrance when in a state of ordinary consciousness. It seems that the Titan, if only his knowledge can be tapped, remembers everything!

Such, in very sketchy outline, are the facts revealed to us by the psycho-analysts. It remains to ask what use the teacher can make of them.

At the outset, it must be emphasised that no teacher, having studied a few books on the subject, should attempt

[1] Dr. William Brown, *Talks on Psychotherapy*, p. 28.

[2] See pp. 93, 94 ff., 128.

[3] *Op. cit.*, p. 28.

any form of psycho analysis at the expense of his pupils In no sphere of scientific investigation and practice is it more true than in the department of psycho analysis that a little knowledge is a dangerous thing

It remains certain nevertheless, that the general principles of this new branch of psychology are of great importance to the educator

In the first place, parents and teachers should realise the grave dangers of repression The attempt to force all children into one mould, without regard to the individuality of each, is foredoomed to failure And not only will such attempts merely fail in some cases they will cause serious harm A child who is coerced and overwhelmed by repressive treatment may appear externally to have submitted, to have become obedient and tractable, and to be progressing satisfactorily in his educational development. But this is often secured at the expense of a scission in his personality Outwardly he is tolerably obedient and industrious, though lacking in energy and force But deep down in his nature the wounded Titan rages and plots, consuming in vain and futile phantasies the power which might have been usefully employed in the service of society At best such a child may develop into an inefficient and listless member of the community, at the worst, he may become neurotic and even insane

If teacher or parent is to be educationally successful, the children must be led to "render willing obedience and do their duty with cheerful and thankful spirits ' The task of the educator is that ' of guiding the libido from undesirable to desirable channels, *without running any risk of repression* "[1] The unconscious urge of the libido may be likened to a torrent, and the action of education to the

[1] Chella Hankin, *The Jung Analysis and Education*, p. 31

damming of that torrent. The primitive instincts of the child cannot be allowed to develop and satisfy themselves unchecked and unrestrained. "The natural man is enmity against God." If he is to be of service to the community, the forces of his lower nature must be skilfully directed into useful paths. Careless and ignorant damming may be not only futile, but positively harmful. If the torrent is merely held up, the strain may increase until a break is made in the dam and catastrophe ensues. If the torrent is merely diverted without purpose, it may flow on in other directions and do no useful work. But with scientific damming, the greater part of the force may be utilised for the well-being of mankind.

Such considerations should lead those in authority to refrain from controlling the child too harshly, from compelling conformity to a multitude of arbitrary rules, and from forcing application to subjects in which no interest has been aroused.

All this points to the need of individualistic methods in teaching. It is not enough to study child-mind in general. It is not enough to study some individual children, and to be aware that there are differences between one child and another. The teacher must know as much as possible *of the individual child.* Even to know his name is helpful. It gives additional power over him. To know something of his family and home conditions is still more useful. Not only is the teacher thereby guided in adapting his treatment to the pupil, but the child, conscious that he himself and his circumstances are known to the teacher, realises that he is *in the teacher's hands.* "A very different attitude to the teacher has been observed after the teacher has asked the pupil who his father is, and what is his business, how many brothers and sisters he has, etc., or any number of personal details, without the

slightest reference to the form of disorder which may have *caused the teacher's attention to be specially directed towards this pupil*"[1]

The deeper knowledge of the pupil which psycho analysis can give is at present denied the teacher But in normal cases, and under a healthy educational regime, such further probing is probably unnecessary In some difficult cases, however, it would doubtless be very helpful "It often happens," writes Pfister, "that an aversion to a certain subject or to several of them can be removed by analysis One boy was not able to learn mathematics and languages because his father kept insisting that he should study them, but in natural science and manual training, which in his case were associated with his mother, he did excellent work In uncovering the father complex, psychanalysis *enlisted the excellent abilities of the boy in the interest of* the formerly hated subjects "[2]

The teacher who adopts individual *methods usually gets* to know more of the tastes and inclinations of each member of the class than he could possibly do under the system of mass instruction It is, of course, possible to introduce some measure of individual teaching without much consideration of the inclinations of each pupil But, wherever possible, some degree of choice should be granted to the pupil It is largely for this reason that such methods as those of Madame Montessori[3] for infants and *the Dalton Plan[4] for older pupils are so successful* They

[1] Lay, *op. cit*, p 282
[2] Quoted by Lay *op. cit*, pp 278 9
[3] See pp 133 4
[4] A method in which each pupil has a large amount of free time, and disposes of it as he pleases, being governed however, by a contract to complete a prescribed amount of work in each subject within a certain time.

are much less likely to cause repressions than the older methods.

At the same time, it must be borne in mind that liberty must not be allowed to degenerate into license. We must remember that our object is to get the child to accept cheerfully the necessary restrictions of civilised life, and to become a useful member of the community. By all means, let us govern without harshness, and suggest rather than drive. But, in some cases, the child, try as we will, does not respond to our suggestions. If he is left entirely free, "psychical gravitation" will keep him permanently on a low level, not only of knowledge and skill, but—what is still more to be deplored—of morality. Some compulsion will at times be necessary.[1] If it is applied in full sympathy with the child's nature, there is every prospect that it will achieve its object without harmful consequences.

In our control of the child, therefore, we must be careful to avoid, on the one hand, giving free course to the lower nature, and, on the other, so repressing it that the Titan detaches himself and goes off to brood and develop in secret. A casual revolt from the paths of propriety must not always be taken too seriously. If it is dealt with too severely, the repression may start a complex which, being further developed by other acts of repression, may lead to a serious split in the personality concerned. It is often far better to treat such a case indulgently. It may be regarded as a harmless "boiling-over" of the feelings. Some would even welcome it as a cathartic, which purges and relieves an overstrained nature. Without showing approval of it, one may often largely ignore it, especially if one is tolerably certain that it is only a passing phase. The accompanying sketches (Fig. 22) from *The Star* are an interesting illustration of such a case.

[1] See quotation from Mrs. Mumford on pp. 128-9.

Our great object then, in dealing with the child is to avoid wounding one part of his nature so severely that it

Fig 22

cuts itself off from the rest and goes on developing in secret R L Stevenson's *Strange Case of Dr Jekyll and*

Mr. Hyde is, though fictitious, a true account of the tragedy which may result from such dissociation. In the vast majority of cases, of course, the results are not so serious. But, if only the truth were known, it would probably be found that in a large number of appparently normal cases dissociation of the libido from the affairs of real life leads to an immense waste of psychic energy, which in the aggregate is far more serious, and far more to be deplored, than the occasional catastrophe of an exceptional soul. In many of these cases, the Titan does not hide himself completely away. He persists in the background of consciousness, consuming a large part of the available energy. Only a minimum of attention is given to the duties of life, the greater part of the psychic force being used in fond imagination of successes which are not attained in real life. Sometimes the individual constructs these for himself in day-dreams. More often, even this activity is too arduous; and he resorts to excessive novel-reading, watching of football matches, going to the "Pictures," and other easy forms of passing the time by witnessing the success of others. It is important to note that in these diversions the Titan identifies himself with the heroes whose glorious deeds fascinate him. The individual, who is usually a failure in real life, satisfies by such spurious achievement the cravings of a libido which should be the driving force in obtaining real successes. By all means, let those who have worked hard occasionally divert themselves in some of these ways. But the heart of a man should be in his duties as well as in his recreation. Only so can life be fully happy.

Before we conclude this brief account, a word or two should be devoted to the extreme views of Freud with regard to the importance of the sex instinct. Freud believes that the sex instinct is extremely active even in

young children, and all manifestations of affection or attraction on their part are declared by him to be sexual in character He affirms that most of the repressions of life are sexual ones, and that the chief cause is the tabooing of sexual matters by adults in dealing with the young He therefore advocates early sexual enlightenment "Followers of the Freudian school consider that this teaching should be given at the age of from 4 to 6 years"[1]

This proposal alone is sufficient to drive away many who would otherwise be ready to study Freud's theories Jung, however, has gradually separated himself from Freud with regard to this matter And his views now approximate to the common sense of the majority of thinking people Dr William Brown, the English exponent of Freud, to whom we have already referred, is also firmly opposed to the view that the sex instinct is of such supreme importance. He cites, in particular, some of the war experiences as furnishing strong evidence against the dominance of the sex instinct "A very large proportion of these cases," he writes, "merely suffered from repressed fear The mental conflict lived through was a clearly defined conflict of fear These men were intensely afraid. They tried to control their fear, and in that attempt their minds became dissociated, they passed into a dream state, where they did not clearly know what was happening to them"[2]

Finally, a few words should be said on the influence of religion This book is not the place to preach any form of religious belief But to make no mention of "the dynamic force accompanying a continuous orientation towards high spiritual ideals"[3] would be a serious omission The religious sentiment may have sufficient force to trans-

[1] Chella Hankin, *op cit*, p. 25.
[2] Brown, *op. cit*, pp. 29 30
[3] Chella Hankin, *op. cit.*, p. 31

form and uplift the whole personality. It can reduce the whole concourse of desires to a hierarchy, in which no particular craving or appetite becomes so excessive as to require repression. This is the highest ideal of education—a completely fashioned will.

QUESTIONS ON CHAPTER XII.

1 State the difference between native intelligence and what in this book is called *total* intelligence. At what age would you expect each to come to maturity? Give reasons for your answer.

2. Give a short account of the purpose and scope of Binet's Tests. Why is it desirable that other tests of native intelligence should be available?

3. What do you understand by the term *group tests of intelligence*, and what is their special value?

4. State what is meant by the term *scholastic tests*. In what ways do they differ from ordinary school examinations?

5. What is meant by the term *curve of normal distribution?* What bearing can it have on the review which a teacher makes of the results of his examinations.

6. State as clearly as you can Freud's theory of dreams, giving incidentally the meanings of the terms *manifest dream*, *latent dream*, *dream analysis*, and *the Censor*.

7. What is the chief difference between Jung's latest views and those of Freud.

8. What is a *neurosis?* Describe briefly the psycho-analytic methods by which it may sometimes be cured

9. What is the *libido*, and what part does it play in life?

10 State clearly the evils of excessive day-dreaming, novel-reading, and similar pursuits, indicating at the same time an excuse for moderate indulgence.

11. Show how the teacher is helped in his work by a thorough knowledge of the individual pupil.

12 To what extent are such methods as that of Madame Montessori in harmony with the findings of psycho analysis?

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